PACKAGE engineering

Fine points of line layout and planning

Discussing the planning, developing, and installing of an entire packaging department in a "model" plant, an expert reveals basic points of packaging line layout and principles of efficient operation. (See page 27)

Machine motion: Constant or intermittent?

A review of the nature and function of constant and intermittent motions with supporting mathematical calculations and specific illustrations that explain these machinery relationships. (See page 32)

How would you manage the packaging function?

An engineer who made the jump from specialized functions to general management reviews his approach to packaging management, cites his organization's experiences in packaging program development. (See page 37)

Complete table of contents on Page 2

FEBRUARY 1958

VOLUME 3 • NUMBER 2

Stamped and Wrapped

by SCANDIA

HARD-BOX PACKS FOR THE CIGARETTE INDUSTRY

SCANDIA

Manufacturers of Better Packaging Machinery

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BUNDLING • BANDING • MULTIPLE WRAPPING • STAMPING • HIGH SPEED WRAPPING

For more information circle No. 201 on Reader Service Card

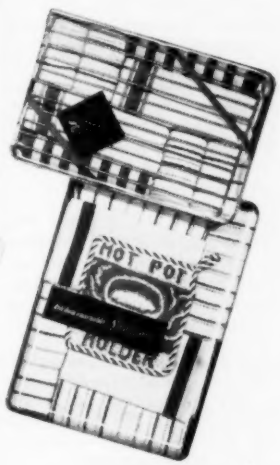
Vitafilm Package Wins Variety Store Silver Award for Startex Mills

Distinctive put-ups of Startex Mills kitchen toweling, utilizing VITAFILM packaging film by Goodyear and designed by Harry Lapow Associates of New York City, have won the Silver Medal Award in the 21st Annual Variety Store Merchandise Packaging Competition.

Thanks to the package design, pricing was prominent in a brilliant red bull's-eye, Startex labeling was readily displayed from either side—and a variety of towel sizes was merchandised via the standardized 7" x 10" fold wrap.

Selection of VITAFILM for a host of Startex packages—from heavy bolt goods to attractive gift put-ups—was made for good reasons: extreme durability under stress of rough handling and temperature changes, clarity, printability and ideal workability under manual and high-speed automatic operation, the film's low cost, failure to attract dust and wonderful "feel."

WRITE FOR FACTS ON THE BEST TEXTILE FILM IN THE FIELD! Address: Goodyear, Packaging Films Dept. N-6432, Akron 16, Ohio.



Striking VITAFILM Gift Set Put-Ups by Startex

Vitafilm by GOODYEAR

60th GOODYEAR ANNIVERSARY

The Finest in Sheer Protection

Vitafilm, a Polyvinyl chloride—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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FEBRUARY 1958 • VOLUME 3 • NUMBER 2

PACKAGE engineering

AN ANGUS J. RAY PUBLICATION

For your calendar

March 24-26. PMME Technical Sessions, sponsored by the TOC Committee of Packaging Institute, Convention Hall, Atlantic City. Contact: Charles A. Feld, Packaging Institute, 342 Madison Avenue, New York 17, New York. *Telephone: Murray Hill 7-8875.*

March 25-28. The Packaging Machinery & Materials Exposition of 1958, sponsored by the Packaging Machinery Manufacturers Institute. Contact: Hanson & Shea, Inc., Exposition Management, Suite 759, One Gateway Center, Pittsburgh 22, Pennsylvania. *Telephone: Atlantic 1-8552.*

May 26-28. AMA National Packaging Conference, Hotel Statler, New York. Contact: E. King Graves, American Management Association, 1515 Broadway, New York 36, New York. *Telephone: Judson 6-8100.*

May 26-30. AMA National Packaging Exposition, New York Coliseum, New York. Contact E. King Graves, American Management Association, 1515 Broadway, New York 36, New York. *Telephone: Judson 6-8100.*

August 11-13. Western Packaging & Materials Handling Exposition, San Francisco Civic Auditorium. Contact: Exposition Office, 759 Monadnock Building, San Francisco 5, California. *Telephone: Douglas 2-7876.*

October 13-15. Packaging Institute, 20th Annual Forum, Edgewater Beach Hotel, Chicago, Illinois. Contact: Charles A. Feld, executive director, Packaging Institute, 342 Madison Avenue, New York 17, New York. *Telephone: Murray Hill 7-8875.*

October 14-16. Society of Industrial Packaging and Materials Handling Engineers, 13th National Industrial Packaging and Handling Exposition, and SIPMHE short course, Chicago Coliseum, Chicago, Illinois. Contact: C. J. Carney, managing director, Society of Industrial Packaging and Materials Handling Engineers, 111 W. Jackson Blvd., Chicago 4, Illinois. *Telephone: Harrison 7-6123.*

See us at
The Packaging Machinery
and Materials Exposition
March 25-28, 1958
at
Convention Hall, Atlantic City
Booth 904

Articles

27 Planning, installing, and maintaining a packaging line area, by Carr H. Parsons, manager, filling and packing section, Lederle Laboratories: Div., American Cyanamid Co.
Emphasizing the basic factors contributing to effective arrangement of packaging lines and efficient handling of contributory services and operating techniques.

32 Pro's and con's of constant and intermittent motions in automatic packaging machines, by Robert F. Windstrup, chief engineer, Peters Machinery Company
Mathematical examples and pertinent illustrations enhance this discussion, which points up the advantages and limitations of both constant and intermittent motion.

37 Know your program, then sell it to management, by Keith N. Stought, plant manager, industrial crane and hoist, Ingersoll Products Div., Borg-Warner Corporation
A man who has moved from technical specialization to general management offers helpful hints on managing the packaging function.

43 How multiwall bag lines attain higher production at lower cost, by Jerold Vaughan, general superintendent, Honeggers' & Co., Inc.
An unusually practical discussion of day-to-day techniques leading to peak efficiency in multiwall bag usage.

50 Factors affecting modern wood package engineering, by Olive Salembier, president, Specification Packaging Engineering Corp.
A definitive, but practical, review of wood as a packaging material — especially for such shipment as air transport.

63 How tiny rollers prevent corrugated box damage, avoid use of extra pads in boxes.
A simple and effective way to keep box flaps from tearing off during sealing.

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74 What we think (our editorial page)

Reader Service Card inside back cover

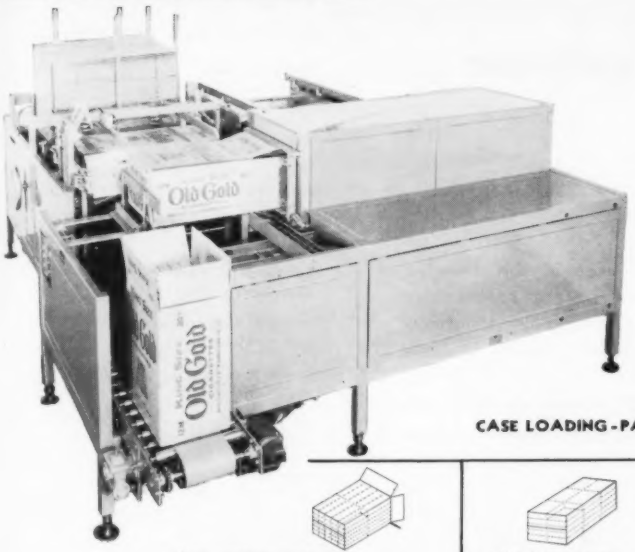
Our December 1958 issue will carry a cumulative editorial index for the year listing our feature articles by subject, author, and other headings.

For more information circle No. 203 on Card →

Which Packomatic solves your production line problem?

T.M. Reg. U. S. Pat. Off.

PACKOMATIC Feeder-Former-Positioner-Loader-Upender



Require a fully automatic case loader?

Here's a fully automatic case Feeder-Former-Positioner-Loader that is breaking records on actual production line conditions in a variety of industries. And by end-loading techniques, savings on paper board alone run as high as 28%. Production jumps dramatically with this high-speed, continuous-motion machine. Labor costs are lower, too, because except for hand-stacking corrugated shipping containers in flat form into the magazine, everything's automatic. Below are some of the end-loading patterns showing number and packing of cartons. Check with Packomatic engineers if your loading pattern does not appear here. Custom-engineering will produce a Packomatic for your product.

CASE LOADING-PATTERNS:

Twenty-four cartons in 12½" x 10⅝" x 8½" case

Eighteen 7 & 8 oz. cartons in 20" x 14⅞" x 8⅝" case

Sixty cigarette cartons
King Size: 17⅞" x 11½" x 22"
Regular: 14-13/16" x 11½" x 22"

Thirty 1 lb. cartons in 16⅛" x 10⅝" x 7¼" case

Twenty-four cartons in 19½" x 10⅞" x 7" case

Forty-eight cartons in 22¾" x 23½" x 15⅞" case

PACKOMATIC
Fully-Automatic Case Loader

CASE LOADING-PATTERNS:

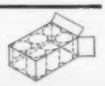
handles any can from the 12 oz. to the 5-qt. Imperial

Six 5-qt. cans or gallon cans in 20 ⅛" x 13⅜" x 9 13/16" case and 20 ¼" x 13¾" x 8¼" case.

Twelve 46 oz. cans in 21" x 13" x 7⅛" case

Twenty four 12 oz. cans in 16⅜" x 10 15/16" x 5 5/16" case

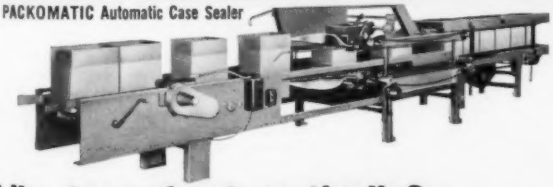
Six No. 10 cans in 22 1/16" x 17⅜" x 7⅛" case



Want a high speed can line?

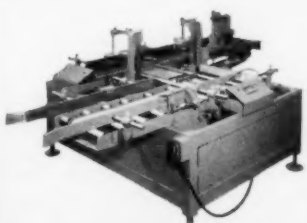
Keep pace with your production line. Now, feed-form-position-load and seal your corrugated shipping containers at high-speeds — up to 720 cans a minute — automatically. This is accomplished with a smooth continuous motion to eliminate jarring and bumping of cans that causes leakers and mars labels or lithographing. Machines in successful operation across the nation (Packomatic was **first** with a successful production-line machine) end-load a variety of can sizes — from six 5-quart cans to twenty-four 12-oz. cans — in such patterns shown at left. End-loading reduces paper board costs. Automation saves labor costs. From corrugated flats to sealed containers, only one part-time attendant is required. Consider this time-money saver for your plant. We can custom-engineer a machine like this for you.

PACKOMATIC Automatic Case Sealer



Like to seal automatically?

Here's the machine for you — the **first** fully automatic case sealer proven under actual production line conditions. No operator needed to align corrugated cases, open flaps, glue, seal and discharge ready for shipment. Adjustable to a wide range of case sizes. Similar models, available semi-automatic.



PACKOMATIC 4-Side Case Imprinter with serial numbering device.

Need 4-Side Imprinting

Prints either or both sides and ends of corrugated shipping containers with name and contents — in addition to imprinting a serial number. Very essential if using modern palletizing methods. The only machine of its kind. Other regular models available for minimum case imprinting requirements. Write for specs and prices.

J. L. FERGUSON COMPANY Joliet 1, Illinois

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A note from the Publisher

What effect does money spent on research and development have on the profitability of a company?

It has been our contention that it has a great deal to do with it, and consequently our entire editorial efforts are aimed at keeping you informed on the current developments in the science of package engineering.

That there is a definite relationship was quite conclusively brought out recently in a talk given by Yale Brozen, professor of economics in the University of Chicago school of business. He illustrated the point with charts showing the very definite correlation between the percentage of the sales dollar spent on research and development and the percentage return on net assets. It was found that there was an almost exact correlation. In a study of nine major industries, the one extreme was aircraft with 9.1% of sales spent on research and development and making a return of 27.4% on their assets; the other extreme was food, spending 0.2% of sales on research and development and returning 10.6% on net assets.

Professor Brozen pointed out that in any business without increased capital (and assuming it is a well-organized business), it is through technological advances alone that a company can improve its profitability.

This is not as complicated as it may sound. True, the giants in the packaging field can and do spend considerable amounts of money on research and development, but even the little companies, the corner bakery for instance, can improve their operation by taking advantage of current developments. I noticed our corner baker is now using a double waxed bag, a considerable improvement over the bag he formerly used as far as "keeping" qualities are concerned.

Perhaps if you took a look at your present packages you might find them lagging behind current developments. A little more money spent on your package or packaging material might enable you to increase shelf life so that wholesalers and retailers would order in larger quantities and thus decrease salesmen's time and billing time. Sales and accounting, of course, are not the responsibility of research and development, but it's one way R & D can improve the profit picture.

The chances are that any packaging machinery you have in your plant more than ten or twelve years old is antiquated. How much could you save in manpower released for other jobs if you replaced antiquated packaging machinery?

In today's competitive market, people are buying packaged products in ever-increasing quantities. The rising birth rate and increase in family formation make this inevitable. To get your share of this business at a profit you must spend an ever-increasing amount of your time and money to keep your packaging operation efficient — both in the machinery you use and the packages you use.

To sum up the original thought inspired by Professor Brozen's talk, the utilization of all possible technical advances increases the profitability by releasing manpower for other jobs.

Angus J. Ray
Publisher

PACKAGE engineering®

AN ANGUS J. RAY PUBLICATION

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Elizabeth Griffith
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Contributing Editor

Irwin F. Megargee
Eastern Manager

Anne Bernhard
Business Manager

Burton Cherry
Art Director

Executive and editorial offices:
185 North Wabash Avenue
Chicago 1, Illinois
Telephone: Financial 6-1440

Eastern advertising Sales office:
National Bank Building
Ocean City, New Jersey
Telephone: Ocean City 3519

West Coast representatives:
The Robert W. Walker Company,
730 South Western Avenue
Los Angeles 5, California
Telephone: Dunkirk 7-4388
57 Post Street,
San Francisco 4, California
Telephone: Sutter 1-5568

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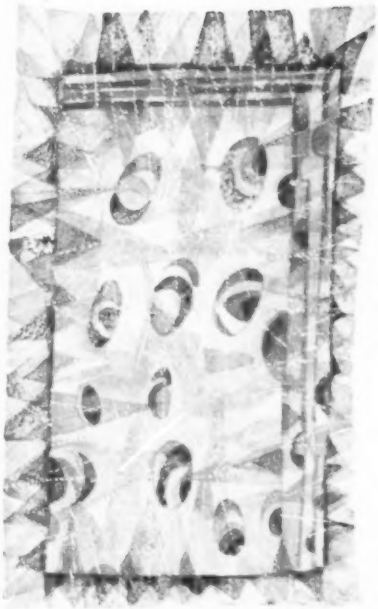
The demand for packaged luncheon meats from Swift & Co. is growing fast and Dobeckmun Durafilm plays an active part in specially tailored 3-side seal vacuum pack liners. Sanitary, sturdy, bright and transparent—this inexpensive packaging keeps attracting repeat sales for retailers everywhere.

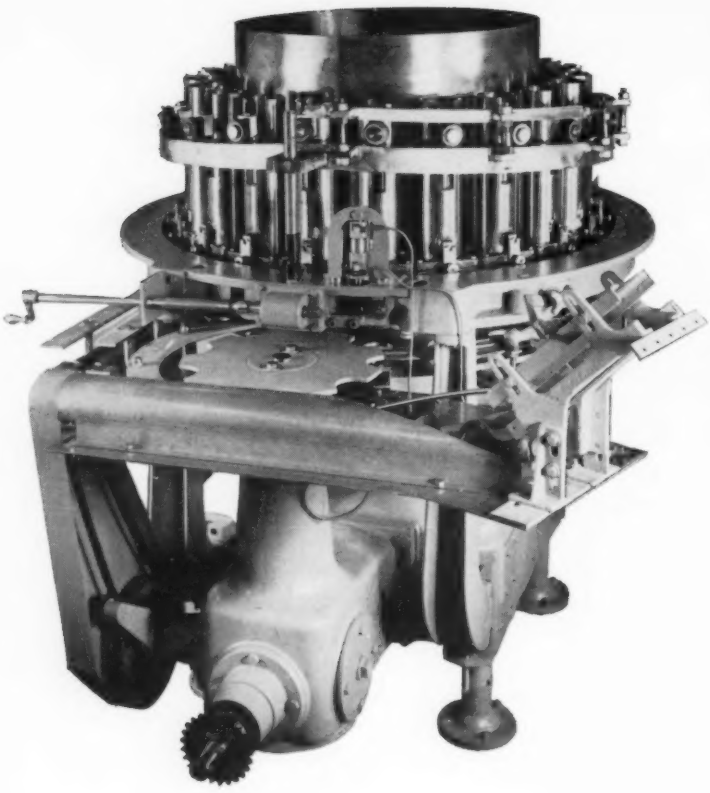
Packages for performance...



Dobeckmun Durafilm is a loyal friend
to the sales-making freshness of food. This extrusion or lamination
of transparent plastic films achieves superior product protection
and presents the look of flavor at its best.
Durafilm is tough, durable, moisture proof
and heat sealing and performs economically on packaging equipment.
Available in a wide variety of types—some with Mylar*—
Dobeckmun engineers Durafilm packaging
to the selling specifications for meats, fish, frozen food specialties,
cheeses and liquids. It is available plain or printed
to put your brand in the foreground at the point of sale.
From your own plant all the way
to the consumer's kitchen—
your product is packaged for performance by

The Dobeckmun Company,
A Division of The Dow Chemical Company
Cleveland 1, Ohio • Berkeley 10, California
Offices in most principal cities

*DuPont Polyester Film



New 21-station food filler
Speed: up to 500 cans per minute
Accuracy: ±0.1 fluid ounce

Now you can package viscous and semi-solid products at fast production rates without wastage and without complicated controls and costly maintenance.

1. New plastic infeed screw handles containers more smoothly, stops jam-ups.

2. "No container—no fill" control stops spills.

3. New positive positioning filler valve control. Valve roll now retained in double grooved track to prevent valve from drifting.

4. Container tilt easily controlled to compensate for centrifugal force, preventing product throw-out with new adjustable, double-open-track container path through filler.

5. New control mechanism for accurate fill is located for safe, easy, and quick adjustment.

6. Complete adjustment of fill through full range of cylinder—4 to 32 oz.—without additional parts.

7. Filler *engineered* to give precise, synchronized transfer of filled containers to auxiliary or closing equipment.

8. No keys or pins to fail or loosen since there are splined shafts throughout (except drive connection).

9. Access to *all* gears and shafts *through base of filler.*

There's more to the story of this model RPC-21 and the complete line of Pfaudler piston fillers in our technical bulletin No. 959. Write for copy.

THE PFAUDLER CO.

a division of PFAUDLER PERMUTIT INC. • Rochester 3, New York

Letters to PACKAGE engineering

Gentlemen:

For sometime now we have been sending men to various universities in order to study SQC principles and their application to the food industry. Each time the men have returned after a 7-10 day session their comments generally have been that the considerations were entirely in the machine tool trade, electronic trades, and any but the food business.

Of course it is understandable that the basic principles remain the same, regardless of industry, but still to the laymen and even the expert direct application to one's own problems leaves a better picture for the mind to comprehend and absorb.

How about your thinking on the matter? Suppose you were running a research and quality control group, how would you handle the SQC assignment in order to maximize the educational benefits supposedly received from the training?

Fred Ziman
Technology Consultant
The Kroger Company
Cincinnati

As we suggested in our detailed reply to you, many organizations have found that the key to any effective training program is to make sure it contains only the amount of training or information necessary. In other words, they would measure their need. A typical way of doing this is to define and spell out just what you want your group to accomplish — in other words, you establish what its members need to know. Then you determine what they actually do know. The third point is to lay out your training program in terms of meeting the difference or filling the gap. Experts on training tell us that

(Continued on Page 8)

VULCAN STEEL PAILS

The manufacturer needing a small package for his requirements can choose exactly the right size and type from the complete Vulcan line of steel pails. Vulcan offers a choice of gauges in both lug cover and closed head types in sizes ranging from one to fifteen gallons.

VULCAN STEEL DRUMS

These drums are the choice of leading manufacturers for the shipment and storage of liquids, plastics, crystals, semi-solids, and powders. All standard drum gauges are available . . . check with us regarding closures and accessories.

CHECK WITH VULCAN ON THESE TOO!

GREASE DRUMS . . . Available in both 120 and 100 pound capacities.

15 GALLON DRUMS . . . A new addition to the Vulcan line—available in open head and closed head types.

VULCAN

Vulcan offers real flexibility with a choice of linings, closures, accessories, and various painting and decorating services. Mail coupon for full information and the name of your Vulcan representative.

VULCAN CONTAINERS INC., Bellwood, Illinois

Gentlemen: I am interested in:

☐ Pails, in the following sizes_____

☐ Hi-Bake protective linings for (product)_____

☐ 55 gallon drums.

Please get this information to

Name_____

Company_____

Address_____

City_____ Zone____ State_____

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Boxmaster cost savings for . . . KNIT GOODS

"Reduced box cost, gained uniformity of appearance"

This famous brand name manufacturer of apparel uses Boxmaster machines to form sturdy boxes of uniform quality at a number of widely separated plants.

- Flat blanks, shipped in bulk to each plant from a single source, take only a fraction of storage space formerly used for boxes.
- Boxmasters at each plant then convert blanks to sturdy, glued up boxes — size changes are easy, costs and packages under control.
- Uniformly attractive boxes of the same quality and construction are now used by each plant.

Whether you have one plant or several — whatever your product — if you put it in a box and use 800 to 10,000 boxes a day, then semi-automatic Boxmaster may be the economical way to get boxes. Users have made savings of $3000 to $5000 a year with just one machine. Send now for complete facts.

United

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140 FEDERAL ST., BOSTON, MASS.

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wrap-ade

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This Wrap-Ade Unit Packager was selected by a **PENCIL MANUFACTURER** to speed production and cut costs.

Shown is only one of many Wrap-Ade Unit Packagers. Other models available for packaging:

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- **POWDERS**
- **TABLETS**
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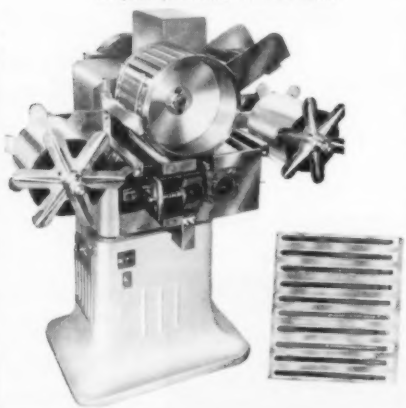
- **FOOD PRODUCTS**
- **HARDWARE**

or any reasonably flat small product

Send us a sample of your product today for our prompt quotation.



wrap-ade **MACHINE CO., INC.**

Celebrating a Quarter Century of Progress in Packaging

83 VALLEY STREET, BELLEVILLE 9, NEW JERSEY

PHONE—PLYMOUTH 9-6150

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Letters to PACKAGE engineering

the way to do it is to avoid overestimating the program by tailoring it to give them the difference between what they know and what they need to know in order to meet the stated objectives.

In applying this procedure to the establishment of quality control within a company organization, you may find it helpful to canvass all pertinent organizations (such as American Society for Quality Control and American Management Association, Packaging Institute, and the like) for their published papers on the subject; discuss your program with people who have carried out similar programs in other companies; get the help of acknowledged experts in the field, many of whom have given papers at the various society meetings, and survey the colleges and universities in your area to see what they are offering in quality control and to find out if they could tailor material to your needs. Above all the program must be geared to your particular requirements, or it will fail to serve you effectively.

Gentlemen:

Your periodical is current, informative and well written. My appreciation and compliments are extended!

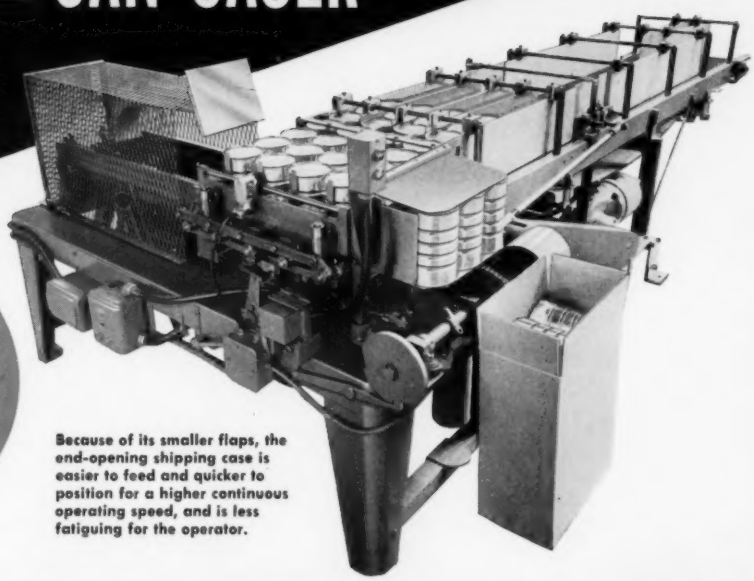
Your column, "A note from the publisher," (December 1957 issue) mentions a chemical used to prevent damage due to extreme temperatures. Any further information you are able to provide on this subject would be appreciated.

Evelyn S. Burke
Rock Island Arsenal
Rock Island, Illinois

The product you refer to is "Transit Heet" and is a product of Jet Heet, Inc., Englewood, New Jersey. We suggest you contact the company for particulars. Also, we urge that you watch our monthly offerings of industry literature, as well as our announcements of machinery and prod-

(Continued on Page 10)

NEW! COST CUTTING CAN CASER



Because of its smaller flaps, the end-opening shipping case is easier to feed and quicker to position for a higher continuous operating speed, and is less fatiguing for the operator.

NON-SHOCK END-OPEN CASER

FOR SINGLE TIER LOADING

46 OZ. AND NO. 10 CANS

With end-opening shipping cases showing a savings of about 15% in fibre alone, no wonder packers using single tier patterns have welcomed FMC's development of this continuous, high speed, automatic caser. Employing many of the key design and construction features of the FMC Model 3 Caser for top-opening cases, this new machine easily handles 1200 cases per hour or more, limited only by the speed of the operator. Cans enter the machine upright, eliminating rolling can impact. As a result, there is no tearing of labels or scratching of lithography; no body dents or split seams. Although used largely for the more common can sizes cased in single tiers (46 oz. and No. 10 cans), the FMC Non-Shock End-Open Caser may also be built for single tier packs of smaller size cans. This machine is a truly remarkable achievement in the field of automatic casing equipment. Write today for complete information, or call your nearest FMC representative.

Putting Ideas to Work

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Canning Machinery Division

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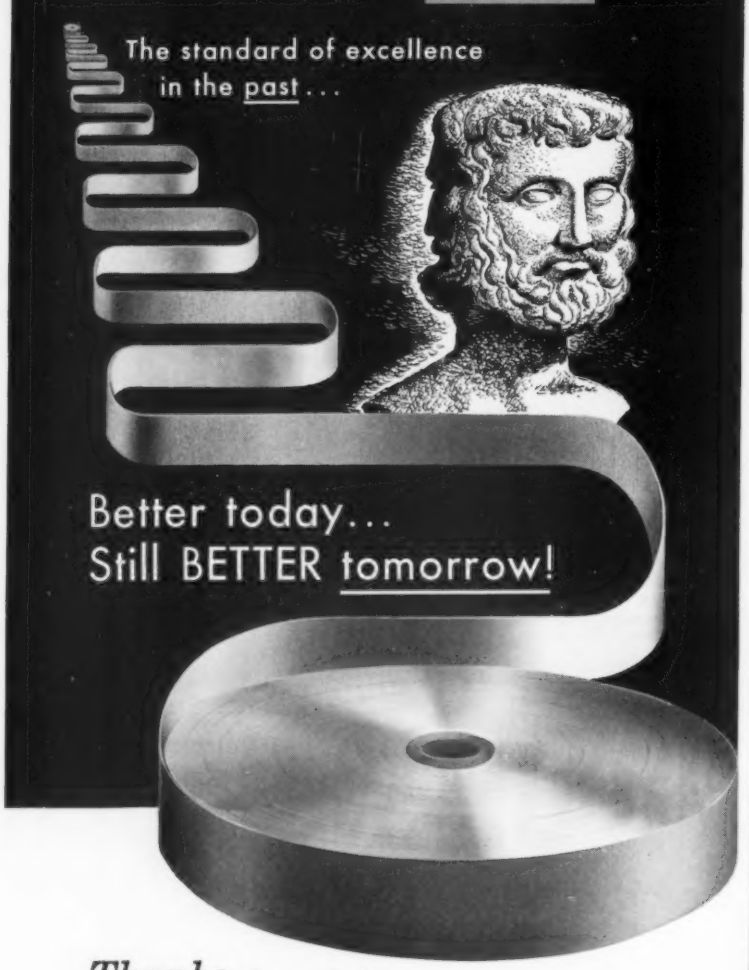
GUMMED TAPE WITH ANIMAL GLUE

The standard of excellence in the past . . .



Better today . . .
Still BETTER tomorrow!

Thanks, in part, to—

DARLING'S *Research for better glues*

DARLING'S *Technical Service, assisting the manufacturer of gummed tape*

IF you're stuck with a question on glue, ask us.

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DARLING'S — improved BONE GLUE

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GLUE DIVISION
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Animal By-Products is Our Main Business

Letters to PACKAGE engineering

ucts, for equipment, materials, and services pertinent to your needs. Our Reader Service Card facilitates your getting in touch with the suppliers involved.

Gentlemen:

We have an aerosol packaging line to manufacture our own aerosol products. We buy the cans packed one dozen in a shipping carton and specify that the empty can arrive at our plant with the open end down. Even though this is done we still find very small amounts of foreign particles in the cans.

By far the largest percentage of returned aerosol cans we receive from our customers are due to these foreign particles clogging up the opening of the aerosol spray valve. In order to solve this problem we have decided that we need some kind of air cleaner to be used for thorough cleaning of the cans prior to being filled with the base and propellant.

We would very much appreciate a list of manufacturers that produce such equipment, or any other suggestions you might have in helping us solve this problem.

"X.Y.Z."

Although Reader X.Y.Z. already has our reply listing various suppliers who might help him, he would be interested in the comments of other readers. PACKAGE ENGINEERING would appreciate seeing any comments or suggestions that readers may care to offer Reader X.Y.Z. and we will be happy to forward them to him.

His query emphasizes the totality of the packaging cycle. His answer may lie in working with the valve suppliers and by giving them the clear picture of the needs in the user's plant. On the other hand it may be that a better job and more effective method of cleaning of cans on the line will be the answer. Likewise, investigation may direct attention to improved practices of post-packaging handling. It will be interesting to see what our readers suggest.

For more information circle No. 210 on Reader Service Card

FAST AND FLEXIBLE, PACKAGE MODEL FF

. . . will wrap nearly any size or shape

Here's the wrapping machine designed to give you both neat, attractive packages and efficient, economical production. On a Model FF, you can easily handle a full line of frozen foods and specialty items.

With its wide size range, the Model FF will wrap cartons, trays and metal-end fibre cans. Size and paper changes can be completed in minutes. Electric eye registration assures the accurate wrapper positioning that results in neat, distinctive packages. Special thermostats for both bottom and side heaters provide positive sealing.

You can get complete details on the Model FF, FF-2, U-61 or on the high-speed Model FF-H, by calling your Package representative today.

Only Model FF Gives You

Size range from 3¾" to 11½" L, 1½" to 5⅜" W, ½" to 3¼" H.

Variable speed drive permits 40 to 100 packages a minute.

Automatic feeder transfers packages from conveyor to chain feed pocket, eliminates need for special drive hook-up or manual feeding.

Special slip clutch prevents breakage in case of package jamming.

Don't miss the newest Package engineering developments at Booth 413, PM & ME Show, Atlantic City, March 25 to 28.

PACKAGE MACHINERY COMPANY, EAST LONGMEADOW, MASSACHUSETTS

NEW YORK • PHILADELPHIA • ATLANTA • BOSTON • CLEVELAND • CHICAGO • KANSAS CITY
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PACKAGE

PACKAGING MACHINERY MANUFACTURERS INSTITUTE PMMI

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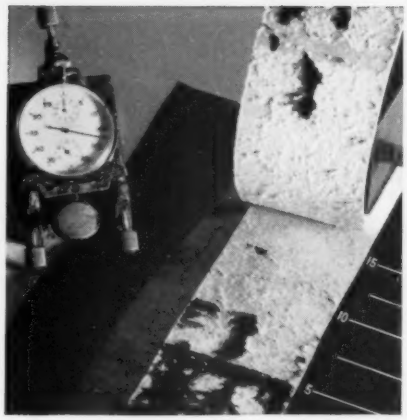
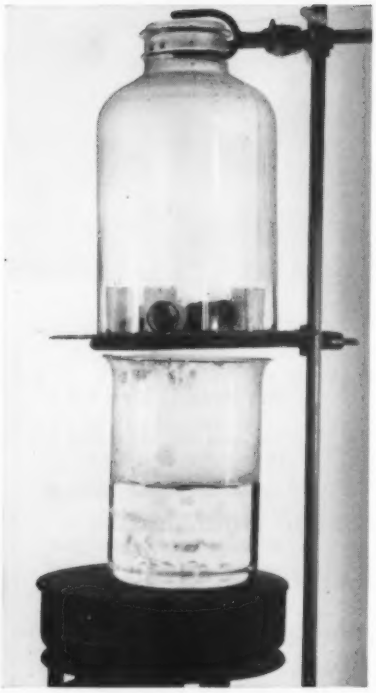
Fiber tear within 5 seconds!
Photo shows how Seban AR-1—carton-sealing adhesive—produces a fast, strong bond. Seban holds, the paper fiber tears. This speed test can be duplicated on actual packaging machinery. Seban grabs in less than 5 seconds, produces a good bond in 12 seconds and tears paper completely within 17 seconds. Choose Seban for fast developed tack, strong bonds.



Seban wins tough sealing tests!



36 minutes in live steam!
This photo shows how Seban AR-5—tube-winding adhesive—resists both heat and moisture in sterilization of paper tubes for surgical products. Steam pouring into bell jar won't produce delamination on tubes sealed with Seban—not even after 36 minutes. Choose Seban for great resistance to heat and moisture!

New line of polyvinyl resin packaging adhesives from Armour

Seban can help you solve your toughest package-sealing problems. Conclusive tests prove Seban meets every packaging need—Cartons—Cases—Window Boxes—Folding Cartons—Tubes—Bags—and more. Seban will help you get increased production and better sealing quality!

Use one of the following machines?

ABC · Dacam	Mor-Can-Pak
Dacamatic	New Jersey
Elliott · Ferguson	Peters
Gar-Pak · Globe	Pneumatic Scale
Hayssen	Post · Potdeven
International	Rockwell · Scandia
Jones · Master	Standard-Knapp
Monitor	Staude

Test the grade of Seban that's right for *your* particular need.

* * *

Don't miss the Seban display in Booth 129—Packaging Machinery and Materials Exposition—Atlantic City, March 25-28, 1958.

ARMOUR ADHESIVE DIVISION

Armour and Company, 1355 W. 31st Street, Chicago 9, Ill.

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New York 5, N. Y.

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210 pound squeeze!

Revealing photo demonstrates how Seban AR-2—case-sealing adhesive—withstands extreme pressure.* Compression test proves Seban can take almost any amount of palletizing—more than 200 pounds—and hold, even when the case breaks down. Choose Seban when great bonding strength is important.

**Gauge shows lbs. per square inch on cylinder—equal to 1/7 actual compression between plates.*

MAIL THIS COUPON

SEAL WITH SEBAN FOR SUPERIOR SEALING!

PE2-58

Send for:

- ☐ New Seban literature
- ☐ A 5 gal. sample at your quantity price, and data on the grade of Seban best for:
  - ☐ Carton sealing
  - ☐ Folding cartons
  - ☐ Case sealing
  - ☐ Tube winding
  - ☐ Window boxes
  - ☐ Bag sealing

Armour Adhesive Division
1355 West 31st Street • Chicago 9, Illinois

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Your questions will be answered . . .

your packaging problems solved at

THE PACKAGING MACHINERY & MATERIALS EXPOSITION OF 1958

Atlantic City Convention Hall . . . March 25 thru 28

Plan your Atlantic City trip right away since you will surely want to see. . . .

- the newest technological developments in packaging machinery and materials.
- more than 150 displays of outstanding packaging machinery and packaging materials — most displays "in action".
- booths staffed by technical men, as well as by marketing and service personnel.
- three information centers distributing authentic data on flexible packaging . . . pressure sensitive tapes . . . wax paper.
- technical sessions sponsored by Packaging Institute.

The Packaging Machinery & Materials Exposition

the first, big, packaging machinery and materials exposition of 1958

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Packaging Machinery Manufacturers Institute, Inc.

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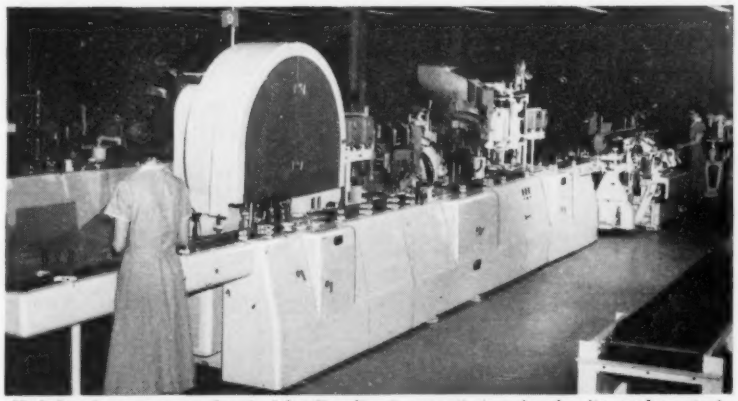
THE LEADERS LOOK TO PNEUMATIC

- New plants Pneumatic equipped
- Avon Products Inc., example
- More speed, flexibility provided

Where "modernization" is the order of the day, packaging is coming in for particular attention. More often than not equipment now in operation has been made obsolete by new design Pneumatic machines — developed for the faster, more efficient handling of dry, free flowing materials, as well as liquids and semi-liquids.

Pneumatic engineers have been exceptionally busy in the last few years, shattering previous standards of productivity through radically different approaches to the mechanics of packaging. Waste eliminating accuracies, and cost cutting speeds never before achieved, now feature the performance of the latest Pneumatic machines.

Leaders in their field — such as Avon Products Inc., makers and merchandisers of a line of nationally known cosmetics — are acutely aware of the absolute necessity to keep up-to-date in the all-important packaging phase of their production. In their sparkling new plant at Morton Grove, Illinois, their famous Avon Skin Freshener and Avon After Shaving Lotion, get the full treatment — from container cleaning right through filling, capping and labeling — on the very latest, fully synchronized high-speed Pneumatic lines. Without the slightest hesitation, on spaced centers to prevent jar or jostle from contact, the containers flow through the different stages as smoothly as oil through a pipe, with never a hand laid on them, from beginning to end.



High-Speed conveyor-synchronized bottling line in operation at Avon's ultra-modern plant in Morton Grove, Illinois.

Outstanding features of this equipment are the extreme gentleness with which it handles delicate, easily marred caps, and its easy adaptability to changes in container shapes and sizes. Within unusually broad limits, shifts from one to another may be made in short order — with minimum down time. Bottling will never be a bottle neck in this plant.

Keeping containers moving through the line with such automatic regularity and precision as to result in "lower cost per container" handling is a habit with Pneumatic machines. That, no doubt, is the reason why the country's leading producers have the habit of using them so extensively. Doubtless, also, it is the reason why so many other concerns "follow the leaders" to Pneumatic.

★ ★ ★ ★ ★

PNEUMATIC SCALE CORP., LTD.,
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★PNEUMATIC

Shipment of tape for you, Charlie. How come you changed brands?

So now you wanta run the Shipping Department! Changed because me and Purchasing agreed that Safetex would save us time and money.

Knowing you, Safetex must save work, too!

If you don't stop yakkin', we'll be outta tape before you get this unloaded!

Any smart Shipping Department foreman can tell you that SAFETEX seals right . . . the first time, every time! For efficiency and economy, order the gummed tape that smart Shipping Department foremen want . . . SAFETEX!

SAFETEX SUPERSTANDARD GUMMED TAPE

CENTRAL PAPER COMPANY • MENASHA, WISCONSIN

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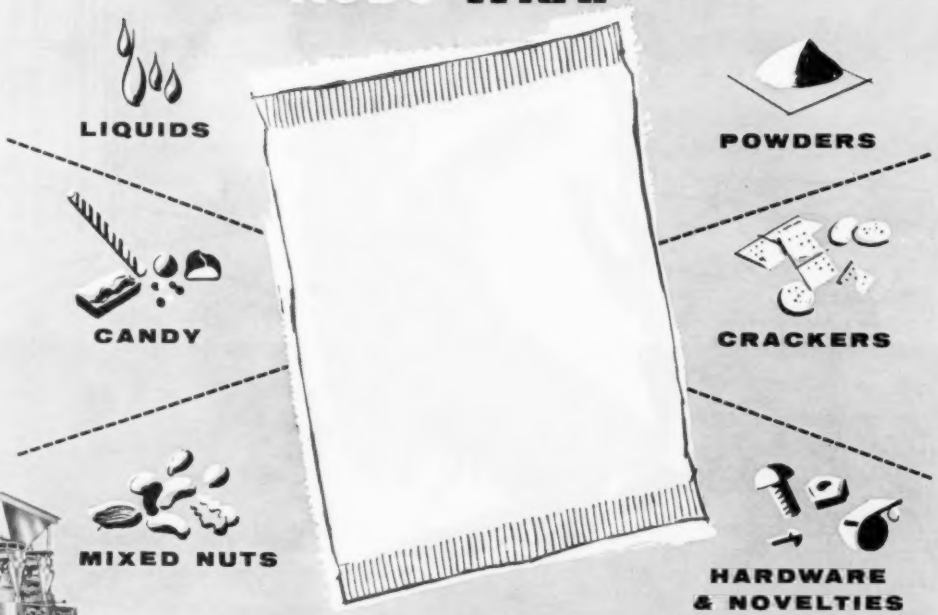
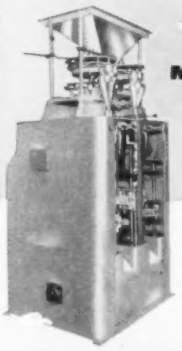
DO IT AUTOMATICALLY WITH LYNCH

ROBO-WRAP





PILLOW-PACKAGING IS FASTER...COSTS LESS!

You'll see some *real* manpower savings with Lynch ROBO-WRAP! One operator and Robo-Wrap can form, fill, and seal 60, 120, 240 pillow-packages a minute. Exclusive hand-over-hand action does the job faster than any other machine. Robo-Wrap changes package size quickly; takes cellophane, polyethelene, saran, plyafilm, mylar, foil and laminates; handles solids, liquids, powders, and granules easily; keeps them clean. New booklet gives full facts on low maintenance and simple integration with existing equipment. Write for it today.

LYNCH ROBO CORPORATION
A Division of
LYNCH CORPORATION
Anderson, Indiana

Get better surface p

A sales-clincher in the appliance field is often the beautiful finish of the product. Regardless of modern packaging methods and careful warehousing operations, this beauty is often marred. Kimpak provides the protection that may mean the difference between sale and no sale.

For more information circle No. 217 on Reader Service Card

protection with KIMPAK®

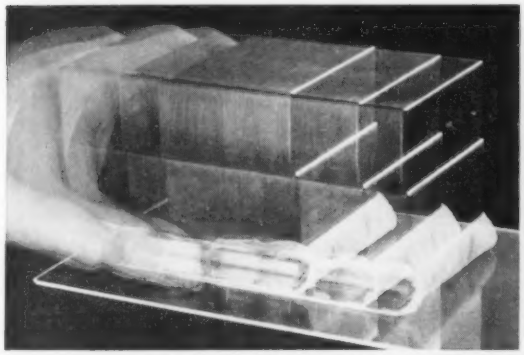
INTERIOR PACKAGING

How can you be sure the cushioning material you select offers effective surface protection against shipping hazards?

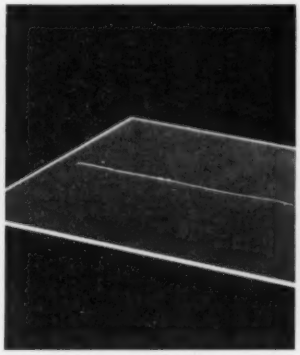
The best way is to test it *under load*. For under load conditions that simulate shipping hazards you learn how effective the thickness really is.

The "Scratch Test" shown below shows how Kimpak under load provides far better surface protection than the competitive product of equal *apparent* thickness.

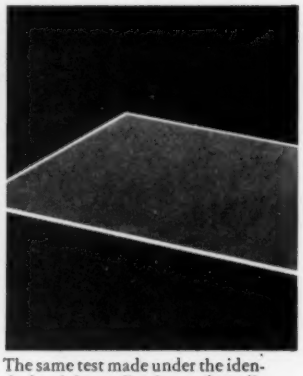
In this test an adjustable needle protrudes from the underside of a Plexiglas test block. The block is wrapped in cushioning material and measured weights are applied to simulate load.



When the block is moved across the surface of a Plexiglas sheet, a scratch will appear in the sheet if the packaging material does not provide effective protection.



In the test shown in above photo a packaging material of equal apparent thickness to Kimpak fails to provide effective surface protection and results in surface damage.



The same test made under the identical weight application and needle setting, shows Kimpak has the thickness under load to provide adequate surface protection.

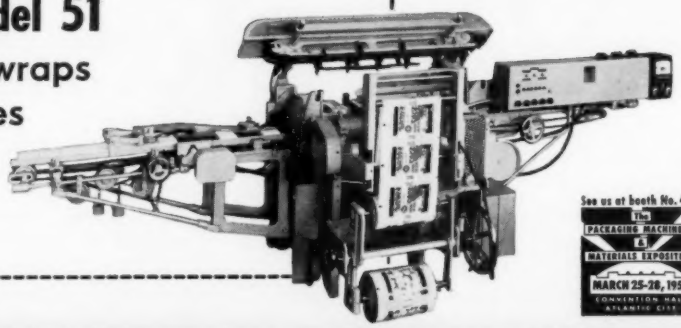
Kimberly-Clark
INTERIOR PACKAGING
KIMPAK

Proof by Demonstration—A Kimberly-Clark representative will be glad to demonstrate this and other modern laboratory tests with Kimpak *right at your desk*. He will also supply you with a precision made, standard weight to measure the effective thickness of cushioning materials under the 3½ pound per square foot load prescribed by Federal Specification. Write to Kimberly-Clark, Dept. E-28, Neenah, Wisconsin.

Kimpak is a trademark of Kimberly-Clark Corporation, Neenah, Wisconsin

This Battle Creek Packaging Machine Model 51

has handled overwraps within these ranges at speeds up to 180 packages per minute



See us at booth No. 406
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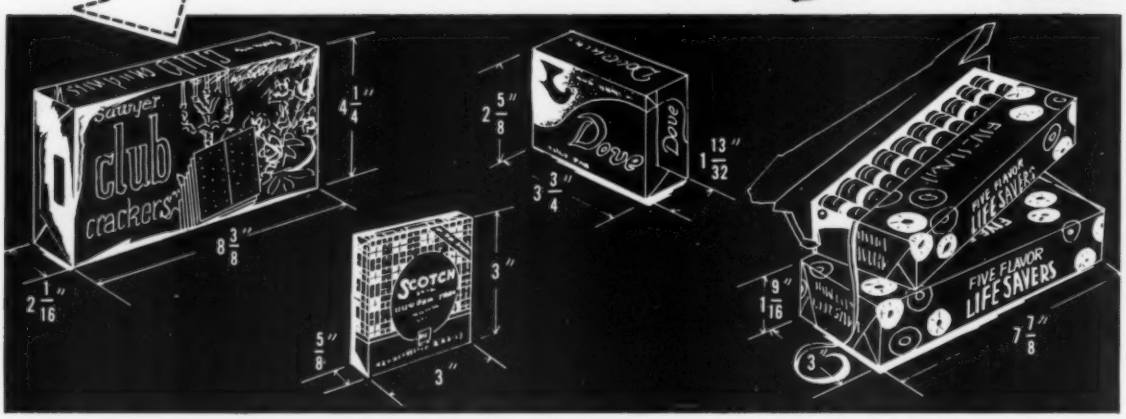

to produce finished packages like these

Glossy Green Foil Sawyer Cracker Box Gets Instant Consumer Response

Dove Soap Attractively Packaged by the *"Continuous Flow"* Process

One of the Many Sizes of Scotch Tape Packaged to Stimulate Eye and Buy Appeal with Easy Opening Tear Tape

Easy-to-Handle . . . Easy-to-Store Easy-to-Sell Lifesavers Neatly Wrapped with Convenient Tear Tape for Easy Opening

Where your previous processing equipment produces at a high rate, you need a packaging machine that will equal or better that rate. Failure to do so results in expensive bottlenecks. Battle Creek's Model 51 produces steadily at the amazing rate of 80 to 180 tight, uniform packages per minute producing at a lower cost per package while protecting the quality of the product through a faster processing operation. The *"Continuous Flow"* procedure offers a labor saving advantage in that it can be timed to match previous operations without an operator. The Model 51 is available with a variety of merchandising and production devices and handles standard size ranges of 3¼" to 5½" lengths (also 6" to 8" special), widths of 2½" to 4½" and heights from ¾" to 2". It wraps beautifully in heat-sealing cellophane, laminated papers, wax-coated papers or heat-sealing foil and offers a choice of end folds. Ideal for long production runs of retail size frozen food packages. Average conversion time is 15 to 20 minutes.

Call on Battle Creek Packaging Machines today for quick, complete service on your packaging problems.

"Continuous Flow" Packaging

BATTLE CREEK
packaging machines, inc.
100 TWELFTH STREET, BATTLE CREEK, MICHIGAN

Alcoa Foil in new corrugated boxes solves temperature and moisture control

Boxes give up to 100% better refrigeration efficiency for shipping and storing all kinds of perishable foods and food products . . . reduce shipping weight, provide more shipping space by eliminating need for packing with ice.

They keep cooked and baked foods fresher . . . protect pharmaceuticals. Alcoa® Foil laminations lock moisture in or out, wherever it belongs depending on product requirements.

Gleaming Alcoa Foil also brightens up these containers for point-of-sale display—attracts more impulse buying . . . gives added look of quality.

Attention corrugated box manufacturers—Alcoa Foil in corrugated boxes offers so many advantages to so many industries, you can count on a bigger and bigger demand, bigger and bigger sales. Especially to packers now using wooden boxes . . . foil laminated containers cost less, are much lighter, are disposable, and can be supplied in knocked-down condition.

Alcoa can send you data that they have developed to help you design and make these boxes. For full information on foil lamination suppliers, and to get our specially prepared booklet, *New Alcoa Foil in Corrugated Boxes*, write to this address: ALUMINUM COMPANY OF AMERICA, 1651M Alcoa Building, Pittsburgh 19, Pennsylvania.

ALCOA ALUMINUM
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"ALCOA THEATRE"
Exciting Adventure
ALTERNATE MONDAY EVENINGS

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Lighting fixtures, with fluorescent lamps pre-installed, are packed in just the right amount of Gaylord corrugated packaging.

'JUST ENOUGH' PACKAGING SAVES MONEY

Naturally you're concerned about how much shipping protection you give fragile products. But more packaging than needed cuts your profit margin.

Gaylord's engineering and research staff can come up with exactly the right amount of corrugated packaging to do your job. A few of many successes: lighting fixtures, elegant glassware, costly oscilloscopes.

Find out now if you're overdoing a good thing. Call your nearby Gaylord packaging engineer.

Gaylord Boxes

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS
KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF **Crown Zellerbach Corporation**

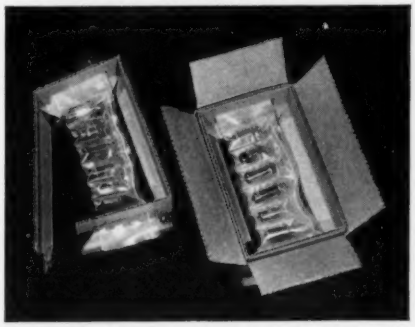
Fresh or frozen . . . Liquid or solid

Fresh bread stays softer longer in a film bag made of BAKELITE Polyethylene. The bag retains moisture, protects against handling, and has a soft, warm feel. Housewives reuse the polyethylene bag in the home, where it helps build brand loyalty.

Fresh potatoes—25 pounds—are packaged in this sturdy, transparent, reusable convenience bag made of polyethylene film based on BAKELITE Brand Resins. Compare the sales appeal with ordinary packaging. Larger size and better looks build bigger unit sales.

Frozen apple slices have a fresh look that appeals to the shopper. Polyethylene film bag won't crack with freezing, shipping, or handling. Packager also found that the apple slices didn't turn brown in the bag.

Liquid cream now goes to the dairy in polyethylene film bags like these, packed four to a carton, saving up to 75% space over milk cans. The sturdy bags reduce weight, eliminate washing and storing cans. Other liquids, such as acids and syrups, are shipped the same way.



Fragile radio tubes are enclosed in pockets formed by heat-sealing an envelope of polyethylene film. The film swings from die-cut and scored cardboard insert in a corrugated box, protecting against shipping shock.

Sell them in low-cost polyethylene film

Maximum protection and sales promotion at low cost . . . these are vital packaging benefits that fight the profit squeeze. To be sure you have them, compare your present packaging material with the star performance of film packaging made from BAKELITE Brand Polyethylene.

Check for: chemical resistance * toughness * tear resistance low cost * versatility * reuse advantages * excellent printability * soft, warm feel * use in automatic packaging.

It will pay you to join the big trend to polyethylene film. For the names of packaging specialists, write to Dept. BE-157. BAKELITE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

It pays to package in film made of BAKELITE BRAND PLASTICS

UNION CARBIDE

The terms BAKELITE and UNION CARBIDE are registered trade-marks of UCC.

Why do they put "permanent waves" in

For more information circle No. 222 on Reader Service Card

about "flutes in Union Boxes

es" in corrugated boxes?

The small "waves," or flutes, in the center section of corrugated board are a vital box construction feature. Like bridge trusses, they absorb and distribute shock — provide extra rigidity for the walls of your shipping container.

Flutes are like bridge trusses

All flutes, as the illustrations show, are not alike. No one is "best." Each does a specific job. Selecting the type you should be using calls for a detailed analysis of your product. This is one small part of Union's complete package engineering service. These fundamentals, however, are excellent guideposts:

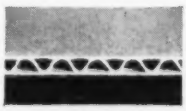
The corrugator forms the flutes

An "A" for cushioning

"A" flutes

"A" flutes were the first type used in corrugated box manufacture. They have the highest arches—about 3/16 inch. "A" flutes are generally used for fragile articles because their greater height offers extra cushioning protection and better stacking strength.

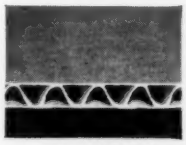
"B" flutes–smallest and stiffest



"B" flutes

"B" flutes are lower, stiffer than "A," have 42 per cent more flutes per foot. Because of reduced thickness, "B" flute board makes a neater package, takes up less warehouse and car space. Excellent for heavy items like canned goods which support their own weight, thus require less shock resistance.

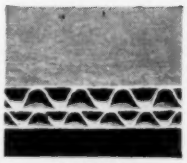
"C"—the in-between flute



"C" flutes

Half-way and happy medium between "A" and "B" are "C" flutes, probably the most commonly used today. They combine the best features of the other two and are often an excellent compromise.

Combinations may be needed



"C"-"B" flutes

Flutes may also be combined, one on top of the other, to form a double wall container. The combinations most generally used are "A"-"B" and "C"-"B." The double walls provide greater protection and cushioning, and are ideal for heavy duty containers.

Union Box engineers are always ready to help you determine the proper flute, or combination. You'll find, too, that the flutes in Union Boxes are consistently well formed—each of uniform height—each taking its full share of the load.

This sturdy construction is one of your best assurances of dependable performance of your corrugated shipping container.

union camp

Write for Union's free, informative booklet "Manufacturing Sheets for Corrugated Boxes."

UNION BOXES

UNION BAG-CAMP PAPER Corporation
233 BROADWAY, NEW YORK 7, N. Y.

Factories: *Savannah, Ga.; Trenton, N.J.; Chicago, Ill.; Lakeland, Fla.*

Sales Offices: *Eastern Division—1400 E. State Street, Trenton, N.J.*
Southern Division—P.O. Box 570, Savannah, Ga.; P.O. Box 454, Lakeland, Fla.
Western Division—4545 W. Palmer, Chicago, Ill.

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Ceiling's the limit . . . with Hinde & Dauch boxes. How do your boxes stack up? Sturdy H & D boxes have stacking strength built in. They stand straight. For top to bottom product protection, better see H & D.

HINDE & DAUCH

Division of West Virginia Pulp and Paper Company

Authority on Packaging • Sandusky, Ohio • 15 Factories • 42 Sales Offices

Carr H. Parsons is a graduate of Antioch College. He joined Lederle Laboratories in 1934. Positions he has held since then include department head in charge of manufacturing tetanus and gas gangrene products, superintendent of penicillin plant, and currently manager of the filling and packing section. Mr. Parsons actively participates in the work of Packaging Institute and the Production and Engineering Section of American Drug Manufacturers Association.

PLANNING, INSTALLING, AND MAINTAINING A PACKAGING LINE AREA

By CARR H. PARSONS, Manager,
Filling and Packing Section,
Lederle Laboratories Division,
American Cyanamid Company,
Pearl River, New York

***In planning** present and future production and packaging operations, most companies underestimate their immediate future needs. Not many packaging staffs have fared as well as that of Lederle Laboratories in developing and retaining reserve space areas. In discussing the general principles and specific applications involved in the layout of Lederle's current operation, Mr. Parsons stresses the importance of having line flexibility, adequate aisles, sufficient storage space, and an efficient, practical working environment. He enumerates many packaging subtleties that measure the difference between a good operation and a mediocre one.*

In recent years there has been a growing interest in long range planning. It was probably unusual, although providential, that a farsighted plant manager started work in 1941 on a project called the "World of Tomorrow," which resulted in 1953 in the completion of new manufacturing and packaging facilities for Lederle Laboratories Division of American Cyanamid Company. It is unfortunate that this plant manager did not live to see how satisfactory the "World of Tomorrow" suits us today.

Work on the "World of Tomorrow," specifically the packaging part of it, (our chief concern in this article), was the task of many people. When originally begun, at a time when construction was impossible, the chief effort was that of the line personnel who would be responsible for its operation if and when it would be "delivered" as expected.

More specifically this included the packaging department head; an equipment expert directly responsible for the routine operation of packaging machinery; a production superintendent, and a methods man customarily assigned to the packaging operation. The line personnel visited many plants in the drug and related fields to assist in getting the best ideas on layout and equipment.

Making Basic Choices

Many prints were drawn up (24 in all) and discussed at occasional meetings with higher levels of management, including the plant manager. Included in this early phase of planning and dreaming were discussions of multiple versus single floor structures, U lines versus straight, spacing of equipment, general material handling problems, and degrees of mechanization. A model was made up with templates to assist in the visualization of the different plans.

Decisions by operating people. From about 1942 until 1951 many plans were discussed and considered. By that time expansion became a necessity. An engineering request resulted in a project engineer being assigned the responsibility of preparing a budget and for giving birth to the "World of Tomorrow." The inclusion of the project engineer and the formal plan to actually proceed with the project did not change the concept of basic responsibilities. Within the framework of company policy, those responsible for operating the area made the decisions.

The chief responsibility of the project engineer was the basic design and material to be used. He did, however, enter into discussions and decisions concerning layout, equipment, selections, etc. Very little outside aid was used. A reputable interior decorator, however, aided in the color selection of tile walls and composition flooring. Machinery and equipment suppliers helped advise on equipment spacing and layout.

Key Points To Check

There are four major factors to be considered in designing these fa-

cilities:

(1) Adequate capacity.

(2) Flexibility in keeping with the rapid changes in products and packages in the pharmaceutical field.

(3) A need for an area which would be attractive to visitors on tour.

(4) A desire to have as close to ideal working conditions as possible.

Naturally, it was necessary to obtain all of these at a minimum cost. These major factors were concepts that furnished the framework of company policy within which the line personnel worked.

Present, future space must be convenient. The entire pharmaceutical industry has been expanding during recent years. Any new facility should consider this factor and build for tomorrow as well as for today. The excess capacity beyond immediate needs must be of a flexible nature to cover any of the varied product types that may develop. In the long run, this boils down to extra space conveniently located and convenient to all services including not only the usual utilities but the special services needed for packaging, such as parts room, glue room, labeling storage area, staging area, etc.

In our plan, we created a large room convenient to all services with a generous surplus of space beyond immediate needs. The amount of extra space provided in building any new plant is dependent on the optimism of the management and availability of funds. At various times we discussed provisions from two to five times the current production level.

Reserve Space: Vital

We actually proceeded with a conservative figure, but left appreciable adjoining space that could be converted to production use if and when required. Warehouse space in areas adjacent to the packaging area is considered expendable if required by packaging operations. We will not assign any such space to a permanent installation other than packaging in recognition of the need in a multiple floor building for a con-

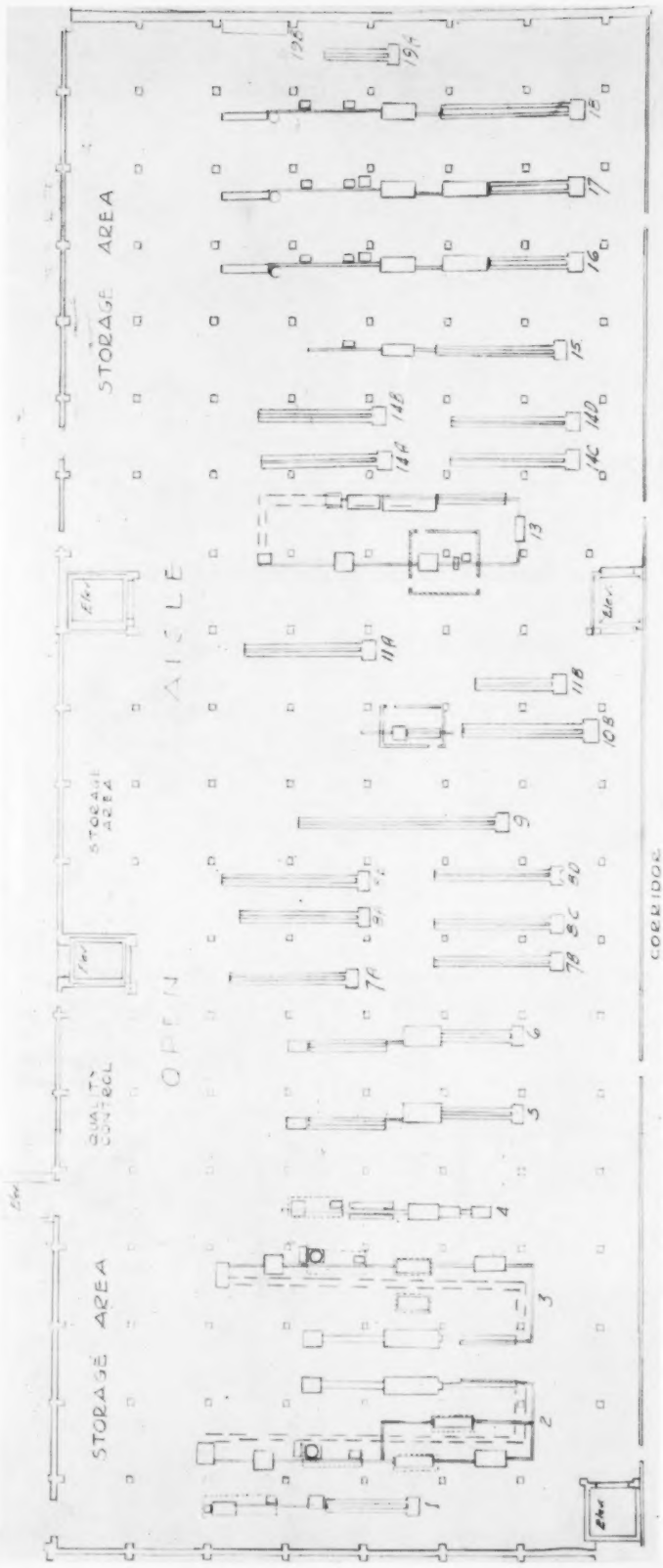

Fig. 1. Over-all plan of packaging area shows the layout of the various lines and the position of traffic aisles, storage bays, and operating space between packaging lines. The packaging room is 400 feet long, 150 feet wide, and is laid out in 20-foot bays. These bays run 40 to 80 feet long.

venient place for future growth.

The pharmaceutical field has not only been expanding in volume during recent years; it has also been changing in product nature. For example, 25 years ago pneumonia was being treated by serum produced by hyperimmunizing horses. During the late thirties it was found that rabbit serum was superior to that of horses and a change-over was made. When serum production from rabbits had been instituted, sulfa drugs antiquated pneumonia serums.

New products demand new packages. During the forties, Penicillin largely replaced sulfas for pneumonia as well as many other infections and by the late forties, the broad spectrum antibiotics Aureomycin[R] and in the early fifties Achromycin[R] had replaced many former uses of Penicillin. The changes still continue. Along with each product change there is a packaging change.

Development of new packaging material and forms such as the plastic containers, aerosols, films, and foils, to mention some of the most important, has affected pharmaceutical packages as it has food packages and other types of packages. Recognizing these many changes going on in the pharmaceutical field and the competitive need to keep pace with these changes, we tried to design flexibility into our new packaging department.

Our general layout detail is shown in Fig. 1. The packaging room is 400 feet long by 150 feet wide, comprising 20-foot bays. Supplies, literature, and bulk product are assembled at the west end of the area where we have almost a bay (400 square feet) for each line. These bays are separated from the start of the lines by a 20-foot aisle running the full length of the room. This aisle gives us adequate space for normal work traffic plus visitors.

Making lines fit needs. All mechanical lines occupy the full 20-foot width of a bay and run 40 to 80 feet long. The width makes it possible to bring in pack-off tables and a semi-automatic cartoner thus modifying lines for special jobs. The length, together with the spacing of individual machines, makes it possible to incorporate other machines into the line when needed. An example of this is the recent addition of a pilfer-proof roll-on machine to some lines so this can be used as well as a conventional capper.

The east end of the room is the discharge end and is provided with space varying from 15 to 20 feet to make possible easy flow of packed goods to elevators. Where lines over 80 feet are needed, we use U-shaped lines where packed goods are discharged directly to the floor below through conveyors. We also have a number of 30-foot conveyor tables where less space has been allowed between lines. These are used for short orders.

Reject U's, Diagonals

Among alternate plans considered before deciding on this layout was one using all U lines, separating supply and display end by partitions. This layout was not feasible with the great variety of lines required to achieve the versatility needed. Another plan had lines running diagonally, the shorter lines at either end.

A final choice between the existing layout and a diagonal layout, because of mixed opinion among the operating group, was made by the general manager of the Lederle Division. The diagonal plan was unique and had advantages in furnishing space needed for our variety of lines. In general, it offered disadvantages in detail of good space utilization.

Providing services, washing. All services are under the floor and can easily be brought up for use at any spot. On liquid lines, the filler and labeler are in pits to allow washing by hose without creating wet floors.

Where possible we have used 30-foot conveyors on mechanical lines, so that when they are not running as mechanical lines we can operate hand-pack jobs on the conveyor. Cut-outs make it possible to insert labelers when needed. Because of the many dated items, especially in biologicals, we have many short or-

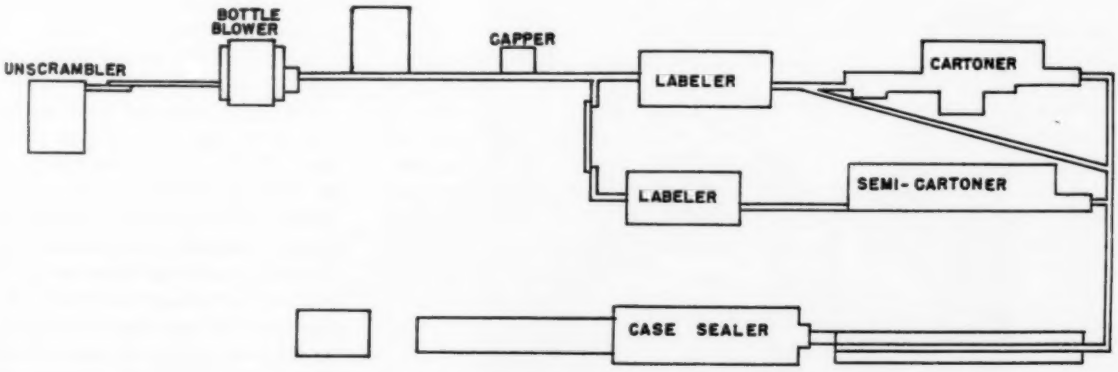

Fig. 2. Positioning of alternate pieces of equipment makes possible a flexible packaging line design. This liquid line is laid out to handle bottles from 8 c.c. to 16 oz., using both round and oval glassware. Note by-pass conveyors.

This 30-foot conveyor table (with a powered belt running down its center) can operate as a manual or mechanized packaging line. Here a portable labeler and sealer are used with its operation. Enclosed area seen in background behind this table is used for powder filling.

A semi-automatic cartoner has been added to the side of this line. It illustrates the value in flexibility inherent in having wide aisle spaces between packaging lines. Also, there is adequate space between machinery. Note that much of the equipment is on wheels for ready portability.

Lederle gets many visitors (12,000 during the past year), so it must have adequate provision for guests. The stanchions standing in these aisles are used to keep the guests from getting too close to machinery — and yet get sufficiently close for a clear view of each operation.

ders that make these tables ideal. Enclosures on powder lines make possible the isolation of irritating powders and on one line provide low humidity to make possible the handling of hydroscopic products.

Handle Container Size Variations

With the exception of the gallon line, all lines can handle a variety of size containers. As an example, on Line No. 3 we can handle bottles from 8 c.c. to 32 oz. and do both rounds and ovals. We can use one of two labelers, can bypass the cartoner, and place a semi-automatic cartoner in the line.

Machine Versatility

Individual machines are selected for their versatility. We have developed our own capsule and tablet counter using the principle of a Syntron and a Lucite draw-board with cavities to give us proper count. These are designed to make a change in draw-boards easy so that both product and product count can be changed by simple adjustment and replacement of draw-boards.

Modifying the lines. Our labelers, in many cases, are provided with compression units so that long labels (heavy copy) can be used when required. Many machines are portable so they can be used as needed on various lines. Our 30-foot conveyor tables can be supplied with tablet counters, powder fillers, liquid fillers, labelers, semi-automatic cappers, and semi-automatic cartoners that are all portable. This makes it possible to do many jobs that do not fit a completely automatic line.

At Lederle we showed 12,000 guests through the plant in the past year. Many of these are professional people such as doctors, veterinarians, nurses, and pharmacists. An important part of the tour is through the packaging operations where we have found it desirable to take them near enough to the operation to identify the products and see in some detail the methods of operation. In creating this attractive area, we did many things that would be necessary or desirable to obtain ideal working

conditions for our employees. As a company policy, we think the ideal working conditions are an essential to good operation.

Working Conditions

Our packaging area is air-conditioned. Temperature in the low 70's is maintained and humidity is maintained between 40% and 50%. Lights are placed in a false ceiling. They are fluorescent and give us about 75 foot-candles of light. They are changed on a scheduled basis rather than at time of failure. The false ceiling is made of acoustical tile and all machinery is mounted on cushioning to minimize noise.

Guests have close-up view. Wide aisles make it possible to escort guests through the area without interfering with production. Stanchions help keep guests from getting too close to the equipment when crossing the floor. Colors used for the walls, equipment, as well as for the composition flooring used throughout, were chosen to add to the appearance and create a light, clean, and cheerful environment. This is maintained by efficient housekeeping and a perpetual painting touch-up program.

Mirrors are used over one cartoner to make it possible for guests to observe the mechanism of a cartoner without being close enough to interfere with the operation. Piped-in music is used, this being desirable for employee morale and in our experience, getting a favorable reaction from our guests. A display is used at the main entrance of the packaging area to point out the scope and importance of the packaging operation.

Objectives Are Met

We have operated our area for about five years and have found that in general it has met our objective of allowing adequate space for expansion, maximum in flexibility, as well as giving us good working conditions and a "show place" for our visitors. We would be the last people to recommend that the basic design used by us would fit another's needs, as we are convinced that packaging areas must be tailor-made to fit individual needs.

Just as between packaging lines the traffic aisles themselves are wide. Typically such aisles are at least 20 feet wide. Storage bays are at the right of this aisle, while the various packaging lines themselves start at the left. Note acoustic tile ceilings, recessed lighting.

Lederle's original plan was to have visitors see the packaging operations through these picture windows separating the packaging area from the traffic corridor. View from here reveals aisle width as well as attention to such details as floors, lighting, and painting.

We also recognize the fact that we have had to pay for the flexibility we have obtained. We feel that this has been worth the cost, but would hope that in future years this flexibility will shift from the long multiple purpose line to more short specialized lines. This saves floor space and labor, eliminates change-over time, and makes possible greater machine efficiency.

Look to multiple purpose machines. This future dream requires new machine development, especially the development of multiple purpose machines. Combination of air cleaning and unscrambling, of filling and labeling are starters in this direction, and we feel that the future will hold further combinations toward the ideal of a completed package from a single machine.

Greater standardization of packaging supplies and design and closer tolerance on supplies are other items that will help shape a new "World of Tomorrow" into a more efficient packaging operation. While we are quite pleased with the results of the planning that began in the early forties, we are still looking forward to advances that will antiquate our operations and justify changes.

Robert F. Windstrup is a graduate of Illinois Institute of Technology with a B.S. degree in mechanical engineering. Prior to joining Peters Machinery Company five years ago, he was associated with Eversharp, Inc., Continental Can Company, and Armour Research Foundation. While in military service he was in the Army Ordnance Department. Mr. Windstrup is a member of American Society of Mechanical Engineers.

Pro's and con's of constant and intermittent motions in automatic packaging machines

By ROBERT F. WINDSTRUP, Chief Engineer,
Peters Machinery Company,
Chicago

Here is an *analytical review of two basic principles of automatic packaging machinery. Mr. Windstrup not only reviews the principles of constant and intermittent motion drives, but also makes some specific comparisons and offers his supporting mathematical calculations. In developing these comparisons he also looks at such aspects as working cycles, space requirements, machine design influences on packages, and problems of maintenance. His observations should help anyone having to make choices between constant and intermittent motion.*

Depending upon the nature of the motion involved in moving the package through the machine, automatic packaging machinery may be divided into two broad classifications: Constant motion and intermittent motion. If the package moves with a constant speed and does not stop in process we have a "constant motion" machine. If the package stops one or more times in transit to permit certain operations upon the package while it is stationary, we have an "intermittent motion" machine. It is common for a machine to have both constant and intermittent motion mechanisms in various parts of the machine not involving the package directly; so, the above definitions refer specifically to the motion of the package itself.

Packaging machinery has been built in both categories and will undoubtedly continue to be, since there is no general argument which can prove one type superior to the other for all applications. The situation may be compared to that facing a man when trying to decide whether to travel by plane or car. Some destinations are accessible by both and a decision needs to be made. Some destinations cannot be reached by plane and the problem is already solved. In general, an intermittent motion machine can handle any assignment, but a constant motion machine offers striking advantages where it is applicable.

Constant Motion Drives

Flights (lugs) attached to chains are commonly used to convey packages through machines. Fig. 1 illustrates linear mechanism, an arrangement of one type of drive components which can be used to produce constant motion. The entire drive mechanism shown rotates at a constant speed in a constant direction, resulting in smooth operation.

Fig. 2 shows a rotary type mechanism for producing constant speed motion. It does not involve chains, flights, or straight-line motion of the package. It is true that with this type the package is subjected to certain centrifugal accelerations due to the curved paths. However, these accelerations are generally small compared with those to which a package is subjected when undergoing intermittent motion at the same output in packages per minute. This type of drive is considerably more expensive than the flight and chain system, but it is necessary in certain heavy duty applications, such as in canning or filling machinery.

Intermittent Motion Drives

Either the linear or the rotary mechanism can be made

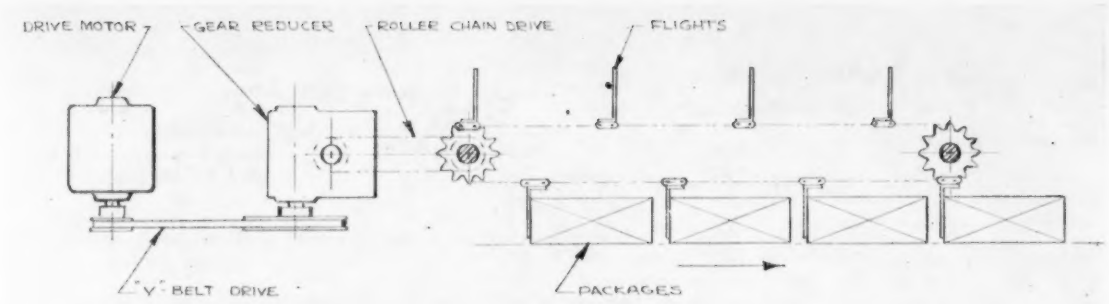

FIGURE 1... CONSTANT MOTION —LINEAR MECHANISM

Fig. 1. In this arrangement the entire drive mechanism rotates at a constant speed in a constant direction, resulting in smooth operation. Either the linear or rotary mechanism may be made intermittent.

intermittent. This may be done by introducing any of the following (and more) elements into the system:

Barrel cam with multiple followers
Geneva arm & wheel
Ratchet and pawl
Overrunning clutch
Epicyclic gear train
Differential gearing

Fig. 3 shows the linear mechanism of Fig. 1 modified by means of a Geneva drive to produce intermittent motion. In this mechanism the cam roller "A" is attached to an arm which rotates at constant speed. It engages a slot in the Geneva disc "B" and indexes it one-fourth revolution. It leaves slot "B", allowing the Geneva wheel to dwell until the roller enters the next slot on its way around. With this arrangement one revolution of the Geneva arm gives one-fourth revolution to the Geneva disc.

If an additional driving arm were provided diametrically opposite the one with roller "A" shown in Fig. 3, one-half revolution of the driving arm would produce one-quarter revolution of the Geneva disc. Under these conditions, the disc would be in motion for an interval of time equal to that which it was at rest.

Most methods of producing intermittent motion can be made to produce different percentages of dwell and drive time as the needs of the cycle dictate. Any extension of dwell time, in order to allow for an easier working cycle, will result in a reduction of indexing time, bringing with it a more violent action.

Comparisons

The constant motion drive has the following advantages considering a given output:

1. Higher speed
2. Smoother operation
3. Lower maximum speed of package
4. Lower stresses
5. Less power required
6. Lower accelerations on package

The intermittent drive has the following advantages:

1. Application is practically unlimited — can be used on any problem where speed is not a limitation.
2. In some cases, the machine can be made smaller.

Since the differences in these mechanisms can best be shown in an analysis of what happens in moving a package through one cycle in the machine, let us examine Fig. 1, and assume that 120 packages per minute are required, that the flights are 10″ apart (s), that the package weighs 1 lb. (w), and that the coefficient of friction between the package and the rails upon which it rides is 0.1 (u).

For constant motion:

To determine constant chain velocity,

1. $s = vt$, where s is flight distance in inches $= 10$
   v is chain velocity in inches/second
   t is time per cycle $= \frac{60 \text{ sec/min}}{120 \text{ pkgs/min}} = \frac{1}{2}$ sec

Then, 2. $v = \frac{s}{t} = \frac{10}{\frac{1}{2}}$

$= \underline{20 \text{ ins/sec. constant chain velocity.}}$

The force exerted on the package by the flight will be equal to the sum of the acceleration force and the friction force. Since acceleration is 0.0 at constant velocity, we have,

3. $F = ma + uw$, where
   m is $\frac{\text{weight}}{\text{acceleration of gravity}}$
   $= \frac{1 \text{ lb.}}{386 \text{ ins/sec}^2}$
   u is coefficient of friction $= 0.1$
   w is weight of package $= 1$ lb.

(Turn Page)

Then, 4. $F = \frac{1}{386} \times 0.0 + 0.1 \times 1$

$= \underline{\underline{0.1 \text{ lb}}}$ total force on package due to flight motion.

For intermittent motion:

Assuming uniform acceleration and deceleration (which will give minimum forces to the package), the following analysis applies.

5. $s = \frac{1}{2} at^2$, where s refers to $\frac{1}{2}$ flight distance in this case, or, 5 ins., over which distance the package is accelerated
a is constant package acceleration
t is time

Then, 6. $a = \frac{2s}{t^2}$

For $\frac{1}{2}$ cycle (the acceleration part), $s = 5$ ins., and $t = \frac{1}{8}$ sec.

Then, 7. $a = \frac{2 \times 5}{(\frac{1}{8})^2} = \underline{\underline{640 \text{ ins/sec}^2}}$ constant package acceleration

To determine velocity of package at time "t",

8. $v = at$, where v is maximum chain velocity
a is constant package acceleration $= 640$ ins/sec.^{2}
$t = \frac{1}{8}$ sec.

Then, 9. $v = 640 \times \frac{1}{8} = \underline{\underline{80 \text{ ins./sec.}}}$ maximum chain velocity

The force exerted on the package by the flight during the acceleration part (first half) of the motion is equal to the sum of the acceleration and friction forces,

10. $F = ma + uw$ (from equation 3)

Then, 11. $F = \frac{1}{386} \times 640 + 0.1 \times 1$

12. $F = 1.65 + 0.1 = \underline{\underline{1.75 \text{ lbs.}}}$ maximum force on package due to flight motion

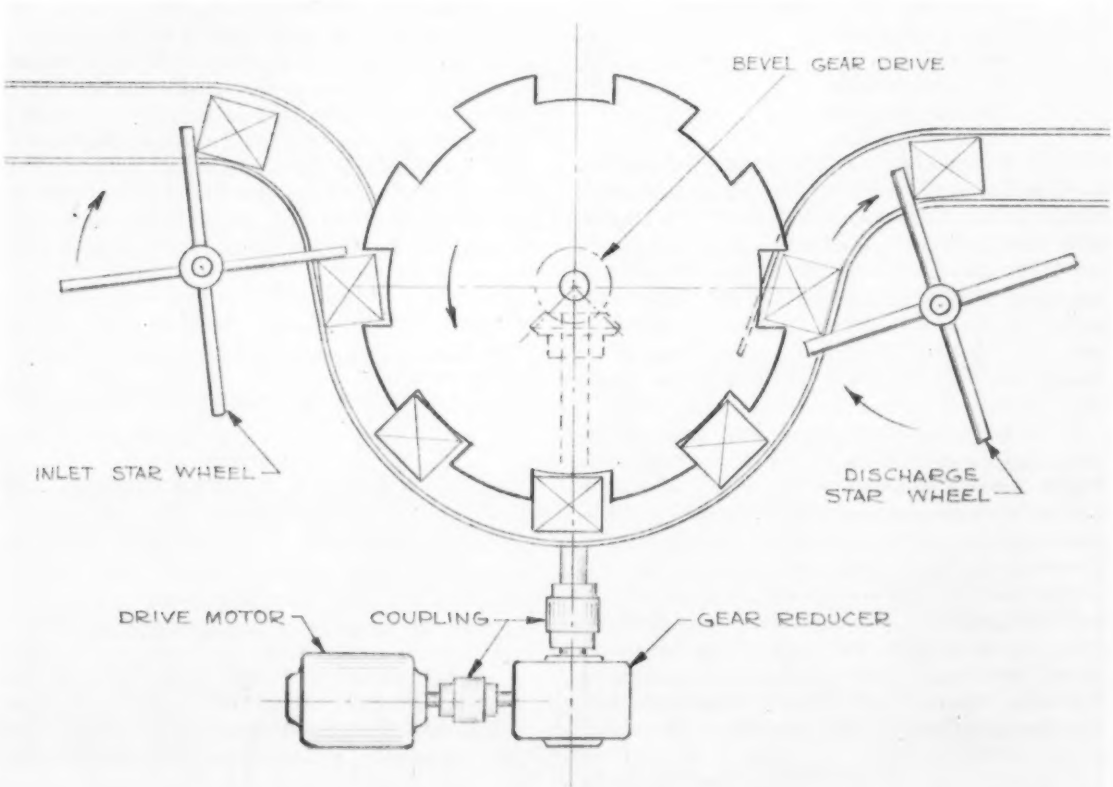

FIGURE 2... CONSTANT MOTION – ROTARY MECHANISM

Fig. 2. This mechanism avoids the use of chains, flights, or straight-line motion of the package. More expensive than a flight and chain system, it serves heavy duty applications — such as canning or filling machinery.

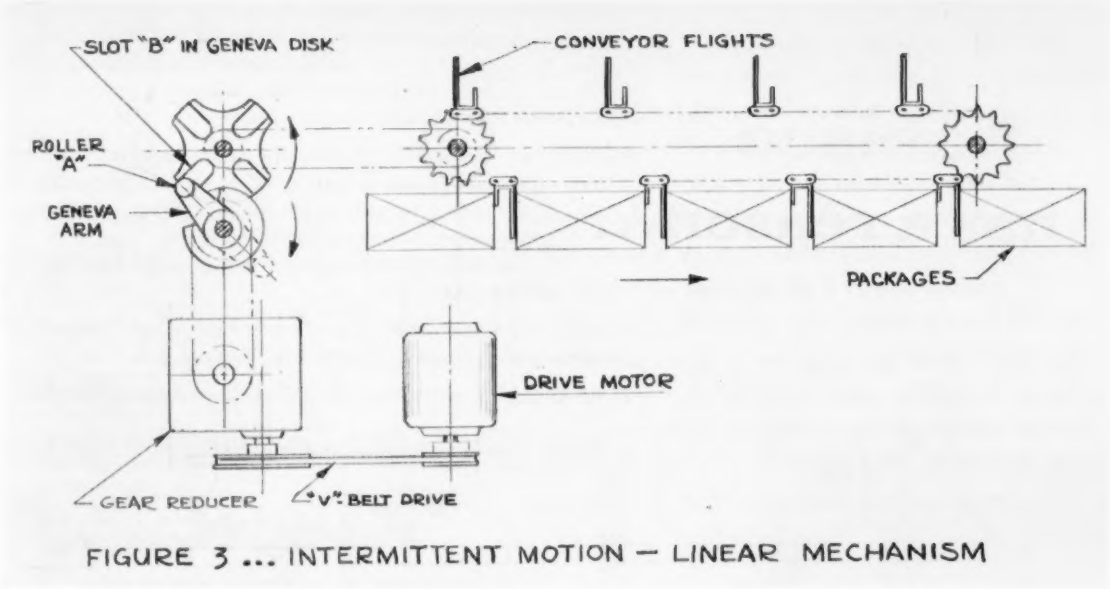

FIGURE 3 ... INTERMITTENT MOTION — LINEAR MECHANISM

Fig. 3. This is the linear mechanism of Fig. 1 modified by means of a Geneva drive to produce intermittent motion. Cam roller "A" is attached to an arm which rotates at constant speed.

For the deceleration part of the cycle, the package tends to overrun the trailing flight and must be retained by a flight ahead of it. Friction in this direction will act to reduce the force between the package and the flight ahead of it.

We see that the constant motion has a real advantage from the standpoint of easy operation mechanically. The maximum speed of the chain is only one-quarter the maximum speed of the chain for the intermittent drive, and the force exerted on the package by the flight is only 5.72% of what it is for the intermittent motion. In an intermittent machine, more energy is generally required to drive the component parts of the machine itself than the package or packages in the machine. Therefore, it is important to keep the weight of these parts to a minimum in order that the forces developed will be reduced as much as possible.

Working Cycles

The working cycle can be considered as that part of the cycle during which work is done on the package. In the intermittent operation this will take place when the package is at rest, and herein lies the greatest single advantage of this type of drive. With the package at rest, any number of complex operations can be performed which would be impractical if the package were moving. Successive stations are generally provided, each doing a portion of the entire sequence of operations every time the package stops.

With constant motion of the package, all working operations must be done "on the fly". If the nature of the required work is such that motion of the package itself provides the power for the operation, this method is very fine.

Certain types of carton forming and closing operations can be handled at very high speeds in this manner. An example of carton forming is where the carton is carried by a forming mandrel through a series of stationary folders and constantly rotating tuckers. Carton closing machines follow a similar principle where a flight is utilized to carry a carton through stationary guides and constantly rotating flap and liner folding members.

If the necessary operations are too complex to be accomplished by the methods described above, it may still be possible to use constant motion. If the working mechanism is made to move with the package so that there is no relative motion between the two during the working cycle, then for all intents and purposes, we have a stationary package on which to work. The economic justification for mechanism of this sort rapidly reaches the point of diminishing returns as the complexity of the working operation increases. When this occurs the intermittent operation becomes more desirable.

In some cases where machinery of either type can be made to do the job the intermittent motion may be selected because greater precision and accuracy can be attained.

Space Requirements

Constant motion machinery tends to occupy somewhat more space than the intermittent motion type. This is

(Continued on Page 68)

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Keith N. Stought is a graduate of Iowa State College with a B.S.C.E. degree. He also is a graduate of the executive program of the University of Chicago with an M.B.A. degree. He has been associated with Ingersoll Products Division of Borg-Warner Corporation for eight years, seven of which were devoted to industrial engineering — including the position of chief industrial engineer. Mr. Stought attained his present position as plant manager as a phase of Borg-Warner's management-in-depth program.

Making a packaging program effective depends on more than the technical competence of the engineers guiding it. They must have definite procedures and follow closely the key points they determine. But above all they must communicate their story to management and be sure it is understood. Mr. Stought recommends close attention to seven key points which he terms the basic economics of packaging: Product design; structural and functional package design; closure methods and crew requirements; interior packing materials; in-plant product and package movement; storaging, and shipping. He stresses the importance of having an underlying grasp of cost data and the necessity of making strong, articulate presentations when selling the program to management. His 16-point list of procedures (accompanying his article) deserves the attention of all who are concerned with maximum product protection for minimum packaging costs.

Know your program, then sell it to management

By Keith N. Stought,
Plant Manager, Industrial Crane and Hoist, Ingersoll Products Division, Borg-Warner Corp., Chicago

Successful consummation of any packaging project depends absolutely on the ability of the packaging engineer to get his story across to top management. He must interpret his packaging developments in terms of the kind of information management wants. This means he needs not only a thorough grasp of the technical phases of his work, but also (1) costs and fiscal data and (2) an ability to interpret the project in terms of the *entire* organization.

But merely knowing this is not enough. He needs complete flexibility and resourcefulness in the art of communication and a bulldog-like tenacity in hanging on — when he knows he has something worthwhile to present to his company. As a starting point, we think the packaging engineer must visualize and understand all of the economics of packaging as found in his organization. Pinning these down in terms of a manufacturing operation such as ours, we find seven key points to the basic economics of packaging:

1. Product design.
2. Package design, structural and functional.
3. Closure methods and crew requirements.
4. Interior packing materials.
5. In-plant product and package movement.
6. Storaging.
7. Shipping.

Applying The Principles

We call these the basic economics of packaging because they all relate to our underlying objective: — Getting maximum protection for minimum cost. We commend this as a basic packaging philosophy for all packaging engineers. It is important to consider all seven points as a total. If you are not studying these over-all packaging economics, you may not receive the kind of warnings we did in regard to our packaging.

One of our packages fell 23 feet from an overhead conveyor without damage to the product. Obviously our packaging was badly over-designed and was thus extremely expensive.

In another instance some years ago we were getting recurring field complaints about the packaging of one of our enameled products which clearly indicated that the package was not

doing its job adequately due to damage sustained by the product. Before undertaking a thorough analysis of the difficulty, all we could do was to speculate on the sources of damage. We did not know how many of the seven basic elements of economics would be involved until we started investigating.

In this instance, we had a packaging problem that involved each of these elements. We found the product was poorly designed and did not lend itself to economical packaging. Our package was not protecting it at the exact points that were weak in the product. The package even used four of the weaker points as a basis for suspension of the product within the package. As a result, the slightest jar transmitted a shock directly to the product — almost always resulting in damage.

We found we were not doing a proper job of packaging on our line. We did not have our crew placed in a correct manner to handle the basic package design. In solving our problem, we came to average out the over-all work load to avoid the difficulty of having too many crew members in certain areas and not enough in others. This analysis led us to review our entire set of package closing procedures, which we subsequently established on a formal basis.

Study Alternative Materials

To determine why our interior packaging was not doing the job, we made a study of numerous alternative materials. By systematic study and elimination, we came to the material we now use. The point is that proper selection depends on more than merely adequacy of performance and reasonable cost.

Looking over our in-plant handling operation, we found one package so large and awkward that it would not go around corners properly. It was jamming our conveyors. In another instance, loose wires dug into the conveyor belts, hooked on conveyor rolls, and generally contributed to jams. In redesigning our package, we provided for its easy and rapid movement along our lines.

We also considered getting the best possible storage and shipment methods. We found that a package (such as that of a bathtub or sink) inventoried in a warehouse for any appreciable length of time can and often does sustain damage. Likewise we found that otherwise suitable packaging might prove very unsatisfactory because of our inability to store it or handle it properly on conveyors as well as in our freight car loading operations.

As we dug deeper and deeper into our package problem-solving activities, we found it extremely advantageous to join the National Safe Transit organization. We wanted to take advantage of the standardized testing procedures established by that group

16 steps to packaging effectiveness

Based on our experience at Ingersoll Products Division, we recommend the following program to any company of limited experience in package engineering, in the hopes that it will help guide them toward the goal of maximum product protection for minimum costs:

1. Analyze your product for best support points.
2. Determine parts of products which must not make contact with package.
3. Determine weather conditions which product and empty package are to be exposed to and select the proper package construction material.
4. Analyze flow of package from empty state through packaging operations and storage to determine specific requirements to facilitate handling and stacking — i.e. a crate traveling over a slat type conveyor would require longitudinal runners where a corrugated box would not.
5. Analyze plant material handling equipment and conveyors to determine minimum and maximum size limitations.
6. After collecting the above data, contact a number of vendors and request a sample package based on your specifications incorporating all of the minimum requirements.
7. Analyze the sample package for any weakness or obvious over-protection points. Determine if the inner-packaging performs the functions called for in points 1 (above) and 2, then if necessary request a new sample package. (Note: Do not hesitate to utilize or at least consider suggestions which may be offered by the vendor, as his familiarity with other manufacturers' packaging methods may prove valuable to you in your initial analysis.)
8. After a package design meeting satisfactory specifications and price has been developed, have it tested by an approved National Safe Transit Committee laboratory.
9. Personally witness the test if at all possible and take immediate corrective action to eliminate all defects which show up in the test.
10. Re-test the redesigned package and make a test production run.
11. Observe the production run with special emphasis on smoothness of flow of package pre-assembly, closing operations, and general behavior of the package through the various pieces of material handling equipment, and finally in storage.
12. Modify the package to correct any difficulties observed.
13. Balance the workload of the packaging crew.
14. Develop a routine checking procedure of random testing of a regular production run package to eliminate possibility of package equality deterioration.
15. Learn to detect the signals of over-production and act immediately to correct them — i.e., a highly abused package which causes no product damage is an obvious case of over-protection.
16. And when you complete all of the foregoing procedures, do not think you have attained the ultimate in package design and cost. You must continue the sustained application of these principles to assure your progress toward your ultimate packaging goal, namely, maximum protection at minimum cost.

and available through the various laboratories approved by it. These tests helped us to isolate our problems and to pinpoint the sources of damage and difficulty.

Test Product Freely

In this connection, we urge packaging engineers not to be hesitant about using enough product to make representative and thorough tests. In our research we battered up a good many packages and damaged a fair amount of product. However, these sinks and bathtubs were, in a sense, sacrificed to the greater good of solving our packaging problems. Had we been reluctant to use enough items to make a thorough series of tests, we might not have satisfactorily solved our problems. Sometimes it is difficult to explain to management why we have to have such quantities of products; an adequate educational program directed to management will win support of testing measures — including the use of enough production to make proper and complete tests.

All these observations stress the importance of systematic analysis of a packaging problem. This not only facilitates its solution, but also helps the packaging expert marshal his information for presentation to management. This means that we must determine (1) what information management should have about our packaging and (2) how much information management has or does not have. It emphasizes the importance of filling the gap between what top management should know and what it actually does know.

To make the most of his opportunities along these lines, the technical packaging specialist must have the viewpoint of a management man. He must remember that top management is concerned continually with cost data. In any organization, management wants to know a lot more about packaging than merely cost data, but with an operation like ours (where the product in the package may not reach the hands of the consumer prior to unpackaging), management's packaging interest is primarily with costs.

Break-through to general management

Keenly aware of opportunities for their own advancement, those concerned with technical and operational packaging often query us as to the upgrading of their own jobs to a higher management level and the preparing of themselves for promotion to general management. The increasing importance of packaging plays its own part in elevating the status of packaging people. Mr. Stought's experience demonstrates what it takes to bridge the gap from technical specialization to general management. His views and suggestions are not theories. Rather, they are practical statements by one who has moved into general management. — R.B.H.

Vital To Know Costs

It is important to know packaging materials costs, labor costs, overhead, equipment cost matters, and such details as the write-off period for machinery. We can't be emphatic enough about the need of having such information in specific terms.

It is not enough for a packaging expert to say that his company now has a less expensive package. He must be able to prove conclusively that it uses the same or less labor, for example, or to demonstrate how its material costs relate to former or alternative packaging, how the indirect costs compare, and how all of these relate to the over-all operation.

In this way, when he comes to make a presentation (formal or informal, verbal or written), he should be able to sum up in the strongest manner exactly what each phase of the project is and how it affects his organization as a whole. Further, his final summation focuses on the costs. We often hear that members of top management are inadequately informed about packaging. Sometimes they have misinformation about possible packaging applications of certain forms of materials. We think this happens because the packaging engineer fails to pass along to management information in such form that management can grasp and use. He is not doing his job properly unless he communicates to management in this way.

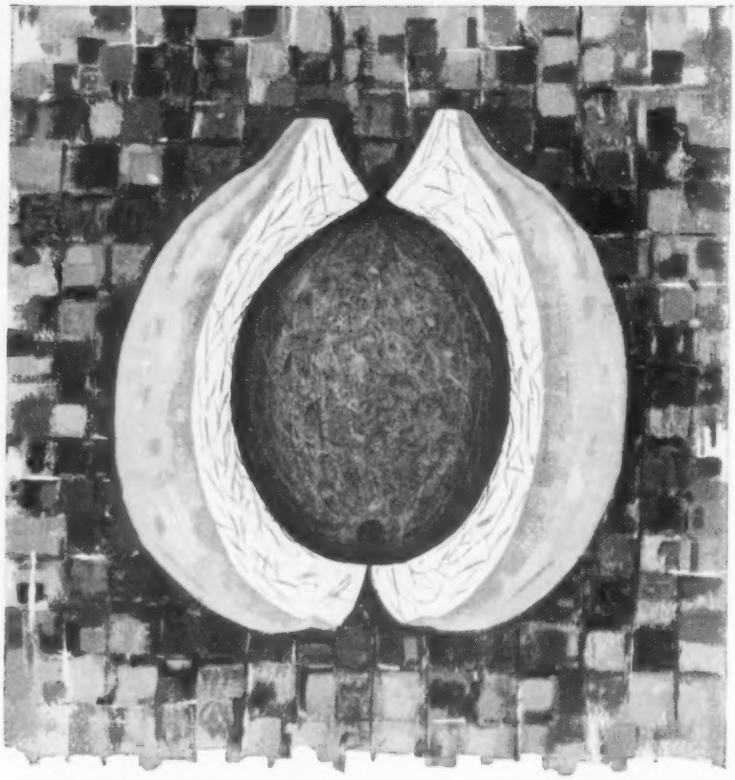
We know of one case where a top company officer wondered why certain heavy commodities couldn't be put into corrugated boxes. A stumbling block, in fact, was not the inability of such a box to hold the product, but rather, its vulnerability to warehouse fatigue due to extreme ranges of uncontrolled humidity during long term warehousing. The point here is that if the packaging engineer had communicated sufficient information to management, the question would not have arisen in the mind of the executive.

Selling A Program

In developing a strong and coherent presentation for top management, the packaging engineer also fortifies himself for dealing with his colleagues. We know of one case where some $50,000 had gone into the design of a particular project. The packaging expert was positive the design was faulty from a packaging standpoint and that the product could not be adequately and safely packaged. Convinced he was on firm ground, he hammered away within his organization until he succeeded in attaining a design modification conducive to effective packaging.

All this presupposes that the packaging engineer has a sincerity of purpose and a combination of integrity and common sense. In spite of the lack of packaging information on the part of management and in spite of the necessity for the packaging engineer to educate his management, the fact remains that members of management often are quite well oriented packaging-wise. This makes it important that the packaging specialist keep management fully apprised on what he is doing and of the problems facing him, his department, and his company.

His means of communication are



Nature's packages are perfect for the job . . . how about yours?

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not as important themselves as is the necessity of holding to his objective when he has a worthwhile development. Actual communication may include telephone conversations, inter-office memoranda, formal meetings, informal notes, casual conversation — and any other means that may show up. The packaging man must be vigorous, aggressive, and articulate, but he must present his story without an appearance of bull-headedness. He must not be unconciliatory.

Avoid Resting On The Record

In maintaining general relations with management, it is a fallacy for him to think he can point to a large volume of money he has saved and consider it a distinct accomplishment. Obviously he can expect a pat on the back for such savings, and no doubt they reflect favorably on his record. However, he must remember that what he has accomplished represents but one phase of the project. It is true that due to his efforts there may be a substantial saving in packaging costs. On the other hand, it is difficult to dissociate his efforts with those of people in other areas of the company — such as on the production line or in the engineering department.

Our experience has been that it is a common failing of a packaging engineer to attain a specific accomplishment, point to it with pride, and stop there. Instead, once he finishes a project, he should regard it as completed and then immediately turn his attention to something else. In this way he is always working with his current projects and is not coasting on the momentum of one already finished. However elemental these observations appear, the fact remains that they point to common failings of packaging specialists.

At the same time, we think that some of the intangibles considered too elusive to measure actually can be measured. Contrary to the opinions of many experts, we think it both possible and practicable to measure the dollar value of a trouble-free packaging line. Judicious use of time and motion studies and careful application of other industrial engineering techniques make possible accounting

for all of the downtime of all of the people involved. This leads to a basis by which to interpret adequately and thoroughly the financial value of an operation free of stoppages. Packaging engineers should take greater advantages of such opportunities.

Getting Outside Help

In solving packaging problems such as in the application of our seven major points of packaging economics, one might take advantage of two other sources of help: (1) Impartial testing, and (2) supplier assistance. As noted above, in one of our early packaging explorations we found distinct help in subjecting our packages to the tests of the National Safe Transit Committee. The results of early tests with our packages prior to their re-design, disclosed graphically the defects against which we had to protect. For example, we redesigned our package to take the suspension of the product at its strong points rather than at the weaker points. Because of the nature of the NST tests, it is possible to observe exactly what type of shock is causing damage. This pinpoints the areas of package improvement.

It is distinctly advantageous for any package user to take full advantage of the experience of his package suppliers. For instance, their salesmen and their engineers are in and out of many plants and have a broad view of the field served. An astute user capitalizes on this information available. Similarly, in dealing with packaging suppliers, it is essential to insist on adequate service.

In this connection it is necessary to balance service against a price and to realize that a supplier offering cut prices might not provide the same degree of service as do those charging more. But whether service or information, it is important for the packaging engineer to make the most of the resources literally at his doorstep — available from his suppliers. It can be very helpful to him in broadening his own viewpoint, and in seeing his own packaging problems from company-wide and industry-wide points of view rather than from just that of his own technical specialty.

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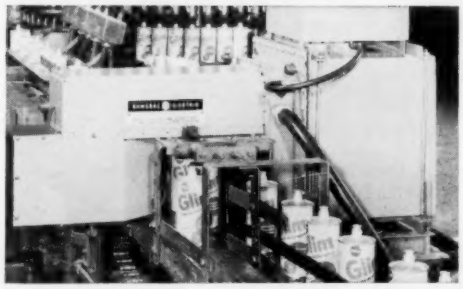
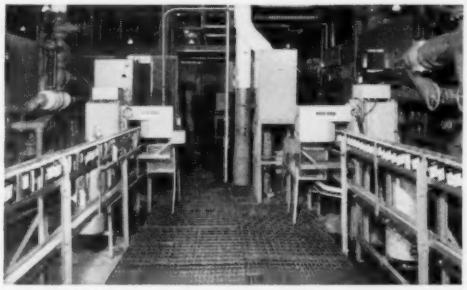


Photo courtesy B. T. Babbitt, Inc.

If it has to move fast...



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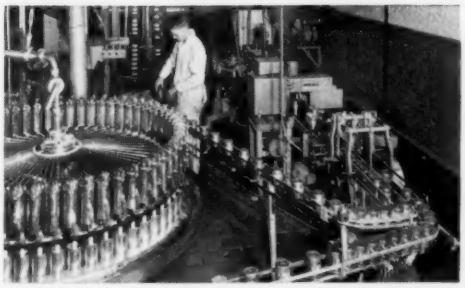

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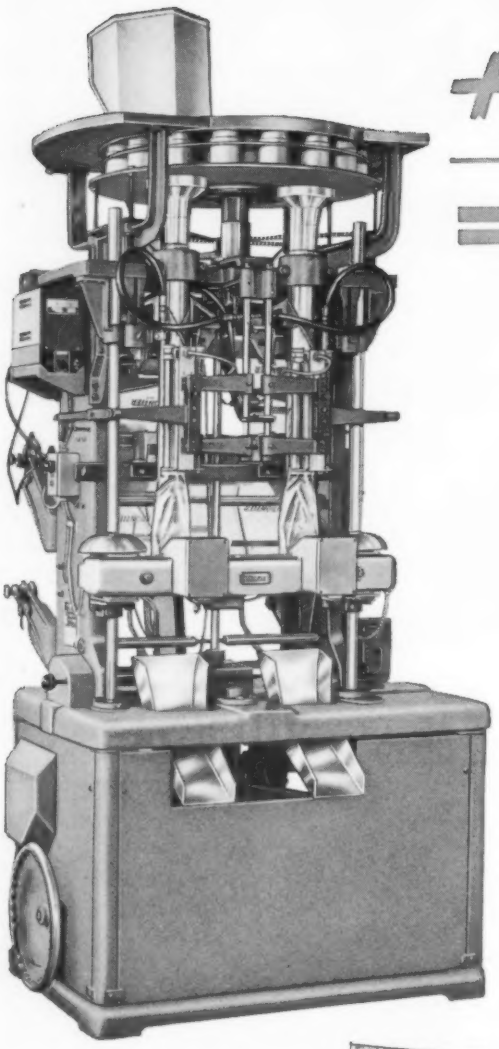

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Jerold Vaughan has been associated with Honeggers' & Co., Inc., for 17 years. He was the first foreman when Honeggers' Fairbury mill went into operation in 1950 and was subsequently promoted to assistant superintendent. Later he became general mill superintendent for the company.

HOW MULTIWALL BAG LINES ATTAIN HIGHER PRODUCTION AT LOWER COST

By JEROLD VAUGHAN,
General Superintendent,
Honeggers' & Co., Inc.,
Fairbury, Illinois

Stepped-up *production demands proper coordination of all the elements of the packaging operation. Noting that his company's bagging costs run well below that of the feed industry generally, Mr. Vaughan takes a close look at factors contributing to higher production at lower cost. He emphasizes such primary steps as adequate product and package supplies, filling and sewing machine refinements, and good operating techniques. He also stresses such supporting aids as the drop-off conveyor, proper clean-up and change-over, and coding and tagging of bags.*

Getting top production from our multiwall bag packaging lines represents a combination of many things. No single one of them is responsible, but the absence of any of them might seriously impair our operation. However, seven primary points and five contributing factors seem to constitute the key to the success of our current operation. These are:

(1) An adequate supply of product; (2) adequate bag supplies within reach; (3) use of a finger hole on the bag to facilitate its being opened; (4) a bag holder on the filler; (5) stop-and-start automatic control unit on each sewing machine; (6) use of an air jet to facilitate string-cutting; (7) keeping bags as close together as possible during production operation.

Contributing or supporting points include:

(1) Using a drop-off at the conveyor leading to our palletizing operation; (2) adequate provisions for clean-up and change-over; (3) proper attention to coding of bags; (4) careful handling of the tagging function; (5) proper control of package net weights.

Primary Steps To Peak Production

1. An adequate supply of product. A lot depends on keeping the filling machines adequately supplied with product. There is no substitute for having enough holding-bin space to eliminate time lost while making production changes. Lengthening out runs and providing adequate bin space facilitates the work of the operators and contributes to more tonnage.

2. Adequate bag supplies within reach. To keep up production, you must have a constant supply of bags to your bagging line. We find it very important to keep a steady, uninterrupted flow of supply always within easy reach of the bagging machine operator. (See Fig. 1)

We bring pallet loads directly to the bagging point. Our plan is to have two 2,000-bag bales directly behind the bagger attendant. An important point in this is to make it unnecessary for him to walk or to reach for bags. We position them so that he merely turns and picks one up. Anything that eliminates causes of operator fatigue steps up production. Further, the larger the bag loads, the less time is involved in getting delivery or transfer of bags. Use of palletized bags assures enough supply for a 50-ton feed run with each load of bags.

3. Use of a finger hole on the bag to facilitate its being opened. (See Fig. 2) Having a finger hole on our bag (a standard, gusseted multiwall) is a definite contribution to faster, easier bagging. This finger hole is a slot one-half inch deep, two inches wide, along one edge of the bag. Having it eliminates one movement of the hand.

In this way, our bagging operator reaches for a bag, runs his thumb under the finger hole, then lifts the bag. With his other hand he opens it up and then both of his hands put the bag in place on the machine. Without the finger hole, he would try to take hold of the gusset, spread the bag, then bring one hand up to open it wide enough to open on the bagger.

4. A bag holder on the filler. Our Richardson bagging machines are now equipped with bag holders. This makes it unnecessary for the operator to hold each bag in place

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Fig. 1. He has an adequate supply of bags within reach and does not have to stretch or step away to get them. Supplies of palletized, empty bags are kept within easy access to this rack. As his supply diminishes, it is replenished from the adjacent (not visible) pallet load.

Fig. 2. This finger hole is a slot ½-inch deep, 2 inches wide along one edge of the bag. It facilitates opening the bag and eliminates one movement of the operator's hand. Without this hole the attendant must take the gusset, spread the bag — then bring one hand up to open it.

during the fill — as formerly was the case before these units were available. Once our operator positions a bag, he presses his foot pedal (see Fig. 3) and the fill takes place automatically. Thus we have another contribution to reducing the fatigue of the operator.

Once a bag is filled, it drops to the conveyor leading to a St. Regis bag settler. This vibrating unit settles the contents within the bag and to a certain extent forms the bag. It runs continuously and has no conveyor. The vibrating action itself moves the bag through to the conveyor leading to a Union Special sewing machine. (See Fig. 4)

5. Stop-and-start automatic control unit on each sewing machine. An important feature of our sewing operation is our use of automatic stop-and-start equipment on the sewing head. Just as soon as a bag reaches the sewing unit (by entering at the V-shaped metal entrance point), the sewing starts. While the bag is going through, the sewing machine attendant holds a tag in position (see Fig. 5) so that the sewing head takes it and sews it to the bag in the course of sewing the bag shut. In this way the identifying tag is secured directly to the bag with the closing thread.

An advantage of the automatic stop-and-start is that the sewing machine attendant has more time to straighten each bag as he guides it into the entrance point. The stop-and-start unit works off a solenoid. As the bag goes into the V, it hits a trip and the sewing action automatically starts. Likewise, when the bag gets past the needle, the solenoid, in effect, pops back and shuts off the sewing action.

6. Use of an air jet to facilitate string-cutting. Another thing we did to improve our production was to position an air jet to blow the string back into the cutting knives on the sewing head. The air blows directly at the string (see Fig. 6) and throws it into a loop. As this loop blows into the cutting knives, it is cut free and the bag just closed is free of the string.

The air starts to pick up the slack in the string as the sewing action is completed. The sewing head is sewing faster than the bag itself is traveling. This contributes the slack so that the air may take it. This air blows continuously and picks up the string as soon as the bag clears.

A major advantage of doing it this way is that it lets us keep the bags just as close together as possible. One of our skilled packaging line attendants operates his equipment consistently with the bags about one-half inch apart. Our experience with automatic cutting (making unnecessary an air attachment such as ours) is that the bags would have to be about six inches apart. We do it this way on one of our slower lines. This is used for our molasses pellet products and similar feeds having high molasses content. A Bemis Packerette unit operates in tandem with a Union Special sewing machine. This latter equipment has a stop-and-start unit and an automatic thread cutter. We can use such a cutter here because there is more space be-

Results we are getting

Our packaging labor costs 25.09 cents for each ton of feed packaged. Our packaging line operators currently receive $1.96 per hour. For both men, this means $3.92. Producing and packaging 125 tons during an 8-hour shift means 15.62 tons per hour. Often the plant runs at an even higher rate — frequently a crew turns out 131 tons during an 8-hour shift. Bagging speeds run as high as 27 bags a minute and as low as 21 to 22 bags. Packaging line crews actually work an average of just 6½ hours a day at their primary tasks of sacking and sewing. They spend 1½ hours, on the average, assisting in truck loading, lining cars, or in cleaning details. But when top production is required, lines run full 8-hour shifts and can produce 150 to 160 tons of packaged merchandise. Thus, in effect, there are 1½ hours of additional packaging line flexibility.

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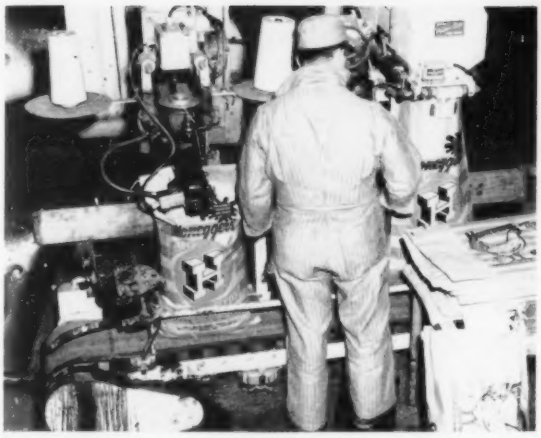

Fig. 3. Once an operator positions a bag, the bag holder keeps it in place. The operator then presses his foot pedal and the fill takes place automatically. Before these holders became available an operator had to hold each bag in place during the filling interval.

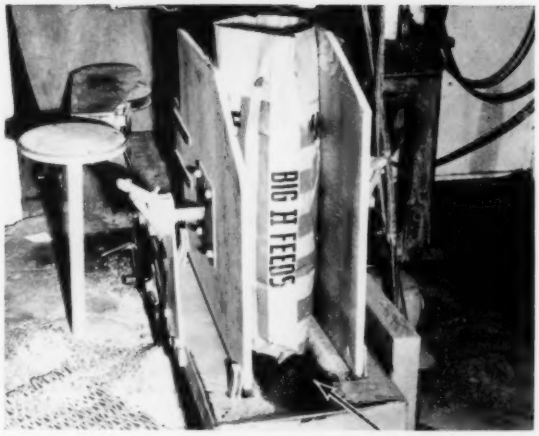

Fig. 4. Each filled bag drops to a bag settler which vibrates the bag, settling and forming it. No conveyor is necessary because the vibrating action moves the bag to the conveyor leading to the sewing machine. The settler runs continuously, not intermittently.

tween each of the bags.

This molasses line equipment handles 280 bags an hour, thus giving 4.6 bags a minute. While it runs slower than our other lines, it is attended by just one man. He can handle both jobs — that is, (1) position one bag and then start another into the sewing head and (2) spot the tag at the same time. Once discharged, it drops to the pallet conveyor just as on the other lines.

7. Keeping bags as close together as possible during production operation. Where it is possible to do so, bags should be kept just as close together as possible — as suggested above. It may be immaterial on lines where the production equipment is the pace setter, but where it is possible for bagging and sewing equipment to run faster, the closer the bags are, the higher the production rate. If you can keep your bags a half inch or even one or two inches apart, your sewing head is sewing almost constantly.

Costs, savings, and production: We use standard quantities of 50 pounds of our various feed products to go into each bag. Taking advantage of the factors suggested above, we bag these 50-pound bags at speeds ranging from 21 to 27 bags a minute. It costs us 25.09 cents a ton to fill and close these bags. Our costs are considerably below those suggested for a model mill by the Midwest Feed Manufacturers Association.

Supporting Aids To Higher Production

In addition to the primary items which help us get more production for less cost, several *contributing* points help, too.

1. Using a drop-off conveyor leading to our palletizing operation. (See Fig. 7) We use this to deliver bags right-side-up to the conveyor leading to each palletizing station. The drop-off unit is simply a combination of stationary members positioned so that when a bag discharges from a sewing machine, it drops, in effect, in two directions and lands on the outgoing conveyor front panel up, top end pointing upward. In this way bags are in correct position for the man at the palletizing point to take them off the conveyor.

2. Adequate provisions for clean-up and change-over. For clean-up and change-over from one product to another, we have an air cleaner to use on machinery. Basically this presents no special difficulty. Clean-up and change-over time is involved primarily in the processing, rather than in the packaging operation. Our scales are enclosed so that dust is practically excluded. Even so, our bagger is subject to routine preventive maintenance every Saturday. We also make minor adjustments at this time.

On our packaging line, change-over time involves about two minutes. Our bagging operator turns on his air-operated vibrator to clean the bin out. In finishing a run, he must trip the last bag by hand. This is because if the bag does not contain a full 50 pounds, it does not trip mechanically. Once this is done, he is ready for his next run of product.

3. Proper attention to coding of bags. As they go through the sewing machine, our bags pass a coder which imprints identifying data on the face of each bag. The operation is very simple, but our crews must be very careful to avoid letting the coder run out of ink. We make a code change for every shift and

Boosting wintertime production

Nothing can slow down bagging and sewing as much as cold hands. During the winter months, we partition off our packaging and sewing areas from the rest of our plant so that our men can work in warm comfort. The entire work area is simply surrounded by four plywood walls and a ceiling. Even the opening (through which bags pass to the pallet stacking table) is sealed with burlap flaps that open only as bags move through on the conveyor — J.V.

Fig. 5. Automatic stop-and-start sewing lets the attendant straighten each bag and hold its identifying tag in place so that it may be stitched to the bag. Correct tagging is important because the same bag is used for many different items. Supplies of tags are kept within attendant's reach.

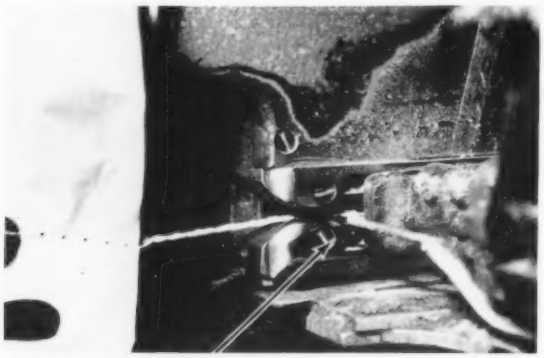

Fig. 6. This air jet facilitates the string cutting operation. It blows continuously, directly at the string, throwing it into a loop. This loop is thus blown into the cutting knives, is cut free, and the bag is free of the string. The air picks up slack in string as sewing of a bag is attempted.

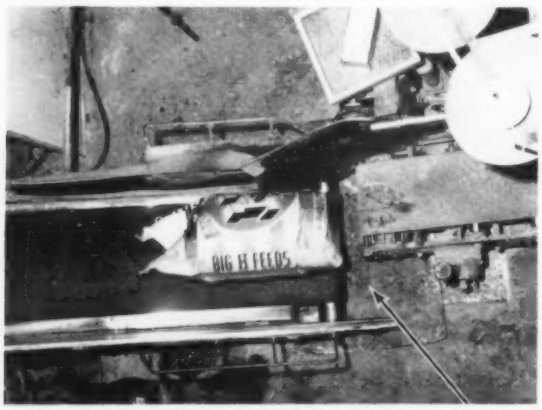

Fig. 7. This drop-off conveyor and stationary guide serves to move bags (discharged from sewing machine) in two directions so that each bag lands on the out-going conveyor front panel up, top end upward. This is the correct position for palletizing at the end of this conveyor.

that is done at the start of each. Printing a code date on a multiwall bag on an in-line basis is difficult because of the varying contours of the filled bags. We look forward to an improved way of doing this, but in the meantime the current method serves our purpose without creating any special difficulty. There is no immediate answer to the variations that are inherent in multiwall bags filled with a powdery or fungible product. It is not like putting code dates on corrugated boxes.

4. Careful handling of the tagging function. An important feature of our operation is placing an identifying tag on each bag. Since we use the same bag for many different items, correct tagging is vital. We keep supplies of tags within reach of the sewing machine operator. He has a responsibility to be sure of having the correct tags, but he is double-checked by others along the line who verify the production and tally the runs.

5. Proper control of package net weights. To maintain accurate weights of filled bags, we set our scales at 50 pounds, 8 ounces. When we bag at 25 bags a minute, our scales are subject to a 4-ounce variation — 2 ounces over or 2 ounces under. Empty bags weigh 6 ounces, so having our scales set at 50 pounds, 8 ounces gives a 2-ounce tolerance, to compensate for the variation when the scale is running 2 ounces light.

We probably could reduce this four-ounce variation with a slower filling speed, but we are seeking peak production. Even so, with an aggregate weight of a number of bags such as those making up one ton, the variances will average out and the correct weight will be present in the total.

We re-check our scales every time we change from one feed to another. Typical of such operations, the machine dribble-feeds the last one and one-half pounds. We have to consider the time required for feeding or filling a feed that is relatively free-flowing as compared to one that is not. Some fill a lot faster than others. Even so, by providing a two-ounce tolerance on our scales, we maintain the desired weights.

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Olive Salembier is a graduate of the University of British Columbia and has done post-graduate work in engineering and packaging at the University of California, Massachusetts Institute of Technology, and New York and Purdue universities. Prior to joining her present company (of which she was one of the organizing founders), she was engaged in teaching and business activities. Mrs. Salembier is an active member of the Society of Women Engineers, Executive and Technical Women of Industry, Society of Industrial Packaging and Materials Handling Engineers, and is the national board member for Southern California SIPMHE chapter. She represents her company in the National Institute of Packaging, Handling & Logistic Engineers, Strategic Industries Association, and National Industrial Security Association.

Careful attention to all factors of wood package design can reduce package weight by as much as 50% and cost by as much as 20%. In making the most of these opportunities it is important to understand the considerations underlying the selection of box and crate materials—considerations such as species, grade, size, quantity, moisture content, and surfacing. In relating the problem of box and crate design to the types of wood available and the requirements of transportation scheduled for use, Mrs. Salembier offers a thorough-going, practical review of problems of testing, selection, and application.

Factors affecting modern wood package engineering

By Olive Salembier,
President,
Specification Packaging Engineering Corp.,
North Hollywood, California

The increasing use of air transport for industrial materials, the development of high-speed trains, and the perfection of modern logistic procedures have increased the importance of wood-package techniques and engineering so dramatically that we feel a review of the subject is most timely.

Consequently this article has been prepared with several classes of readers in mind:

(1) For the newcomer to the wood packaging field; (2) those packaging personnel in industries which only rarely are called upon to box or crate with wood; packaging personnel in plants changing basic production from parts to assemblies or sub-assemblies requiring a change from paperboard to wood packaging; (3) for those who may wish to review the production of packaging firms with which they hold contracts, or who need a guide in establishing such contract packaging arrangements; and, (4) as a check list for experienced packaging engineers.

Industrial packaging today is divided into three main divisions: Commercial, export, and military or government. In recent years, however, the boundaries of these three forms have considerably overlapped so that today many of the engineering techniques of one have become an integral part of the others. For example: Many military packaging specifications have been adopted by export firms as standard operating procedures while, on the other hand, new techniques developed by commercial packagers have somewhat softened the rigid requirements of military packaging.

Basic Considerations

Two major considerations today govern wood box and crate design: Modern types of wood packaging materials available, and the requirements of the type of transportation scheduled for use. Many old woods, once considered as standard boxing or crating materials are no longer used. These have given way to woods from newly exploited forests because of scarcity, the high cost of transportation, or new wood engineering knowledge. In addition, new wood substitutes such as fibreboard, honeycomb sandwich plies, or wood-paperboard combinations are appearing

on the market to replace conventional materials.

By far the most important factors in influencing wood package design have been the changes brought about by transportation. The development of new types of cargo aircraft, high-speed, lightweight trains, "piggy-back" flatcar-truck trailer techniques, and new ship cargo protection requirements all have combined to revise wood packing procedures.

Palletizing is now almost universally adopted. The use of new warehousing techniques also has had effects: Fork lift machinery now permits higher and higher stacking, while the shrinkage of available warehouse space both in the United States and overseas, particularly at small foreign military bases, and the increased use of outside storage all have also had a tremendous impact on wood package engineering.

The effect of change in these fields has been a trend toward the reduction of weight and cube and the methods of determining this procedure for specific jobs. The greatest influence in this direction has been the increased use of air cargo transportation.

Packaging For Air Shipment

Air cargo packaging techniques have been developed as a compromise between weight, cost, and protection. Much commercial machinery shipped by air is merely affixed to a pallet and flown directly from the manufacturer to the industrial consumer since such shipments are generally made to end production breakdowns or other emergency.

Air transportation charges are of no concern since they are but an infinitesimal fraction of the cost of production delays. Machinery so shipped generally is trucked directly from the airport to the factory in question, and little protection is needed except perhaps a tarpaulin during inclement weather.

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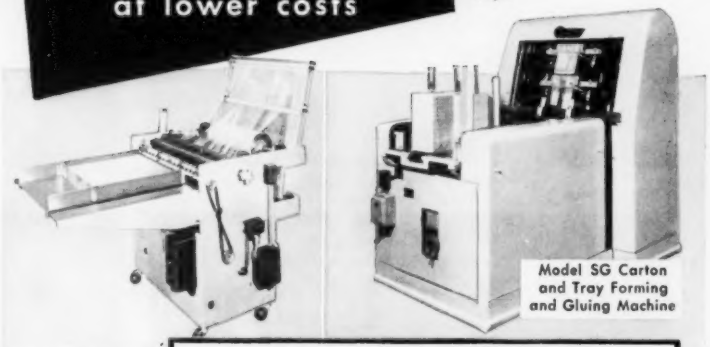

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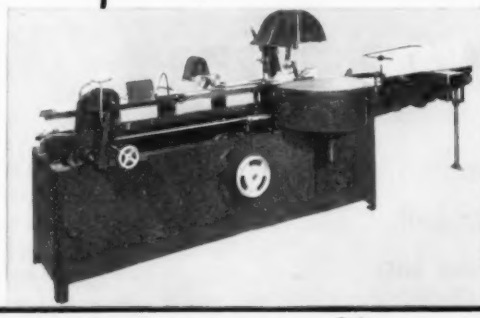

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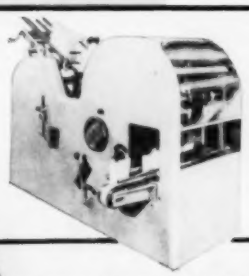

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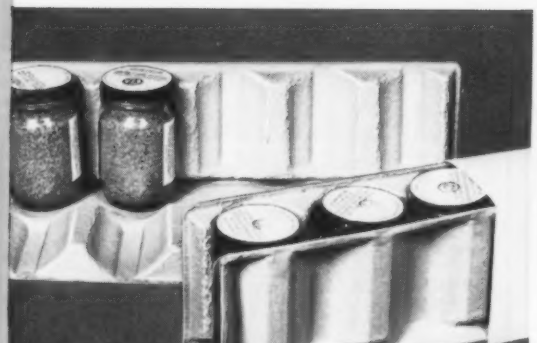

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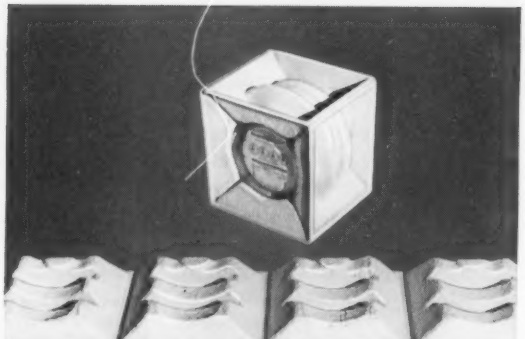

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a sudden shock could destroy the usefulness of the equipment. Such electronic devices must be carefully guarded with cushioning materials, boxing or crating, moisture barriers, etc.

Although such a statement may appear to be extreme, there are many cases on record where entire operations, predicated on the scheduled arrival of the equipment, have been delayed many days at costs in excess of hundreds of thousands of dollars when such equipment has arrived in a condition requiring its return to the manufacturer for rework. In addition, as protection against any eventuality, military strategy and tactics often call for air delivery of equipment — and then it is consigned to outdoor storage for long periods of time.

Because most air shipments are dependent on time, many contract packagers and in-plant packaging engineers have designed wood packages compromising these considerations. The wood packages incorporate the factors of small cube, lightweight, weather protection, and at the same time, high structural strength by the use of ingenious engineering (much of it adopted from aircraft engineering techniques) blended with a knowledge of the latest packaging materials available.

So successful have these engineering efforts been that many of these wood package designs are now being used for other means of transportation since their cost is often less than conventional packaging methods. An example of this is in the development and use of laminated structural members designed with various angles or bows which provide lighter weight, higher strength, and help reduce cube, such reduction in cube for weight offsetting higher initial cost by reducing transportation charges.

Testing Is Vital

The final criteria of wood package design, of course, is simple testing. Packaging personnel without engineering degrees often slip into the familiar "looks strong enough, how could it be damaged?" attitude. What once "looked strong enough" that worked on one form of transportation or for one packaged item may provide little or no protection under other conditions.

Although a package designed for a certain piece of machinery may have proven sufficient for transportation by slow freight, the centrifugal and/or vertical forces applied to a wood package with high inertia content in a modern high-speed train rounding a bend or passing over railpoints has been sufficient in many cases to break down the package and ruin its contents.

If there is any doubt as to the strength of a particular wood package, or if experience is lacking in the design of wood packages for methods of transportation other than those commonly used, it is easy enough to perform a few simple tests. An hour spent in testing could save hundreds upon hundreds of hours of litigation or production rework time.

In the following discussion of wood package materials and techniques, we are omitting both engineering tables and formulas as well as any detailed discussion of military specifications since such treatment is beyond the scope of this article. This information can be readily obtained by consulting engineering handbooks on the subject or descriptive MIL SPEC documents.

Neither will we describe the techniques of nailing since such methods have been excellently described by Mr. L. O. Anderson of the Forest Products Laboratory in his articles, which appeared in *Package Engineering*. (See Page 62, this issue). Instead, we will confine our discussion to outlining the principal qualities of importance in the design of wood packages.

Selection Factors

Considerations of importance when ordering boxing and crating materials include: Species, grade, size, quantity, moisture content, and surfacing.

Which species of lumber is usually used is governed by the geographical location of the packager, although there will be a considerable overlapping of various species used in fringe geographical areas because of

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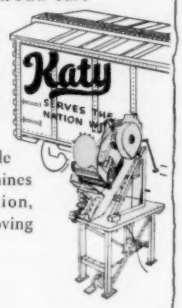

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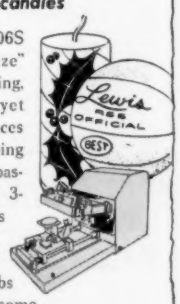

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a particular species' usefulness in ratio to its price. Generally speaking, woods are classified into four major groups: Soft woods, hard soft woods, medium hard woods, and hard woods.

Group I woods include such examples as white fir, ponderosa pine, yellow poplar, cottonwood, etc. These woods have only moderate nail holding power, moderate resistance to splitting, and moderate strength. Packagers normally use these woods for sheathing.

Group II woods include such examples as Douglas fir, Southern pine, hemlock, etc. They have a greater nail holding power than Group I woods and have greater strength. They are also less resistant to splitting and are normally used for structural members.

Group III woods include such examples as elm, gum, ash, etc. They are about the same as Group II woods in nail-holding power, but are somewhat stronger and do not split as easily. These woods are also normally used for structural members.

Group IV woods include such examples as oak, hickory, hard maple, etc. They split easily but have high nail holding power and are very strong. These woods are normally used for extremely heavy and concentrated loads.

To packaging personnel, "grade" is penultimate to species in importance. Although most packaging personnel have a working knowledge of grade, many have not kept pace with progress and still rely upon rule of thumb ordering learned many years ago. What once were standard grades may now be scarce grades. As a result, rising boxing and crating costs often are blamed when scarcity is the real culprit. In addition, there is still a certain amount of confusion arising from the fact that nearly each type of wood has its own association and although there has been a great amount of effort directed towards standardization much remains to be done.

It is still the responsibility of a packager to be thoroughly familiar with the grades and lumber variations peculiar to his own geographical area. However, packaging personnel should avoid the pitfall of judging wood too much on appearance. Such conditions as pitch pockets, stain, etc., can be ignored by packagers since these qualities do not detract from the wood's general utility.

Far more important to grading are such features as knots. Different species of woods vary in the number of knots per 8 board feet from about 5 to 20 with the size of knots varying considerably. Actually, the term "grade" denotes the amount of waste expected for a given operation, which points up the fact that it pays to know your source of supply and its governing rules, the species of lumber indigenous to your locality, and to their variations, since some rules allow up to 15% of knot holes, loose knots, or knots partially open.

After such a warning it is difficult to generalize on grades. But roughly speaking, grades one and two have little waste and few knots; numbers four and five often contain large knots, holes, shakes and decay. Grade V is not available in some species.

Designating Woods

In recent years there has been a tendency by various associations to name (instead of number) their grades of wood. Although this shows progress in the right direction it does create some confusion in the minds of packaging personnel since such grade designations are based principally on building construction terminology. However, their general designations include:

Select merchantable: Highest grade common Douglas fir boards. Usually of fine appearance, they are used for exposed exterior and interior applications in high class construction.

Select structural: Also of fine appearance, this lumber is used where high-strength is also needed and is the top grade of common Douglas fir.

Construction Douglas fir: Common frame lumber.

Standard Douglas fir: Used as fair quality sheathing in cheaper construction.

Utility Douglas fir: Includes rot streaks, quite a few large knots and is used in framing and sheathing in cheaper construction.

Economy Douglas fir: Used in low-strength concrete form construction, certain types of crating, as binding material, and for other uses where strength is not of great importance.

The Western Pine Association now grades white pine with a combination of numerical and alphabetical designations. For example, Number 2 Common White Pine: Generally used for interior paneling, cupboard work, and occasionally as siding.

Number 3 Common White Pine: More larger knots and other defects are allowable in this grade as well as all defects that are permitted in grade Number 2.

Letter C, Select White Pine: Clear stock, although permitting blemishes and a few small tight knots.

Letter D, Select White Pine: more blemishes and knots than C.

Since building framing requirements are generally the criteria, dimension grades should be mentioned. These grades are used where the controlling factor is stiffness or where common building practice controls the size of the member. Such grading is no indication of definite live or dead loads. Yet another means of grading is used. This is called factory and shop lumber grade and for the most part will have little interest for the packager since the wood is designed to be used in the manufacture of door and sash cuttings, etc.

Applying Compromises

As a result of these and other variables yet to be discussed, today's wood-packing procedures have evolved as a result of considerable trial and error. Contemporary wood-packaging engineers have effected a compromise between grade, species, cost, availability, and the use to which the lumber will be put, rather than an arbitrary "across the board" use of grade alone.

For example: Not too long ago, Number 2 and better 1" x 4" and wider common pine was universally

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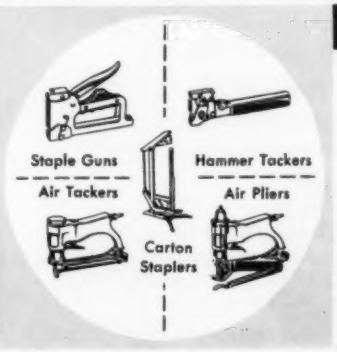

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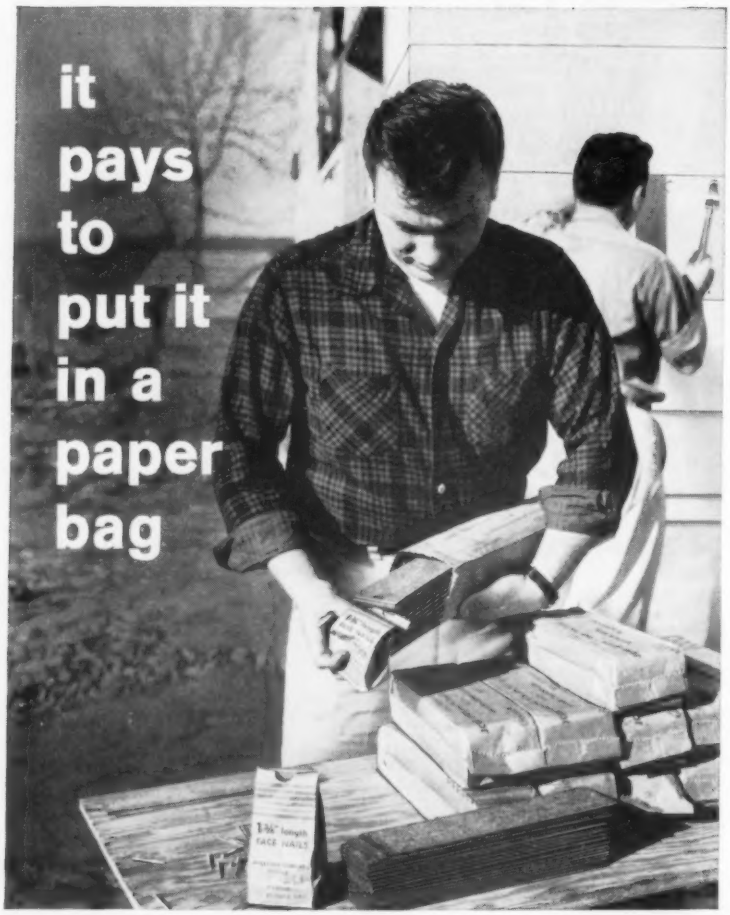

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used for most Western military specifications. Today Number 3 Common Engelmann Spruce is most commonly used. Common Pine knots were too large, the price too high, and is now too scarce for large orders. Conversely the spruce is lower in price, is plentiful, has smaller knots, good nailability, greater strength, lighter weight and greater resistance to splitting. 1″ x 2″ and 1″ x 3″ cleats formerly were made from Number 2 Common Pine and Number 4 White Fir.

Today's practice calls for clear hemlock since the common pine or white fir was found to be too high in price and has too many knots. On the other hand, hemlock has no knots, is lower in price even than Number 2 Common Pine, and effects a compromise on nailability but splits more easily. 2″ x 4″ and 2″ x 12″ dimension structural lumber was formerly KD pine, Engelmann spruce, or white fir of Number 2 grade or better; today's practice calls for Green Douglas Fir standard or better.

Military specification plywood generally is NN.P-515 Class I or NN.P-515 Class II. Type II, Class 2 is usually used for one-trip containers. Type I, Class 2 is usually used for reuseable containers. Current commercial practice calls for Number 4 and 5 Common Pine, and Dry White Fir as well as economy grade Green Douglas Fir, and Standard Sheathing Grade plywood.

The next factor of importance in selecting lumber for specific packaging projects is that of strength and fatigue resistance. If we are to design a unit incorporating minimum weight and cube with maximum strength, we must definitely consider both the positive and negative strength ratios between species and density, grade and quality of wood, dimensions, and load and stress elements and their duration.

The latter include moduli of elasticity and rupture, impact and other bending; compression, crush, sheer, tensile, and torsion strengths; fatigue resistance; effect of temperature (shipments to tropical or frigid zones); method of sawing; and con-

figuration of grain. Details of formuli of each classification may, of course, be determined by consulting such publications as *The Wood Handbook* of the U. S. Department of Agriculture prepared by Forest Products Laboratory.

Negative Factors

All of these must be weighed against negative strength factors, many of which can be determined only by: (1) A general inspection of lumber lots, and (2) detailed inspection of the lumber at the time of fabrication. These factors include knots, abnormal grain divergence, compression and tension characteristics, decay, insect damage, seasoning degrade, and moisture content.

For example: The strength of knotty wood depends primarily on the size and number of knots. This is generally indicated by the grade. What is not indicated by the grade is whether or not the knots are ingrown, encased, or dead; their shape (determined by how the board is sawn, a knot can be round, spike, or oval); checking; the effect of the knot on the surrounding grain; and on the clustering of knots. Wood with two or more knots in the same cross section is not suitable for structural members in packaging.

Of prime importance is the duration of load factor which requires extraordinary engineering concentration if units are to be placed in outdoor storage or are to be warehoused in stacks. The modulus of elasticity for any given board is proportional to its moisture content and seasoning.

The package and continuous storage of such heavy fragile items as electronic data reduction devices which have no inherent strength in themselves is very critical. They should never be placed in packages constructed of green wood or wood which has undergone seasoning degrade. Even when the package is subjected to minimum excursions of vibration, "set," or "sag" deformation of the equipment is quite possible.

An additional consideration in the design of wood packages for long haul conditions or long storage is

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"impact." Such woods as just discussed may be subjected to occasional impact without damage to the static load. However, repeated minimal impact or continuous vibration on one plane may also create permanent distortion of the package and damage to its contents.

Since for each one percent loss in moisture content below the minimum fiber saturation point of 30%, the shrinkage is about 3%, it will well pay the designer to study not only the condition of lumber as it is shipped to his plant but the plant yard's storage and wood package storage conditions as well.

How Wood Shrinks

The problem of shrinkage is particularly critical in the design of wood packages for storage since the ultimate wood moisture content depends upon the temperature and the humidity of the air in which it is stored. It must be also remembered that increase of moisture content is the exact converse of moisture content loss.

A good "rule of thumb" to remember is that heavy wood species generally shrink more across the grain than lighter wood species, and that shrinkage of wood with tangential growth rings is about twice as great as wood in which the growth rings are radial. Very little shrinkage occurs in wood in which the growth rings are longitudinal. The importance of close inspection during fabrication is emphasized by the fact that in one board in which rings are longitudinal, growth forces may have created a section with irregular grain which will shrink or expand at a different rate than other board sections causing severe distortion.

The methods of curing wood that must also be taken into consideration are the differences between air dried and kiln dried wood. Kiln dried wood has less weight, less degrade, and holds paint better. Unfortunately the terminology used in describing the moisture content of seasoned lumber varies between various wood associations, different wood producing areas, and in commercial and military meanings.

Using Preservatives

The use of wood preservatives, whether paints, oils, or chemicals, does much to eliminate this problem, although at an increase in cost. However, it is the duty of the ethical wood packager to inform the consumer of the package of the conditions likely to be encountered that may affect package reliability.

Such preservation techniques are legion. Painting, usually the most expensive method, may be called for only when the package is designed for considerable reuse, or if it is designed to house the equipment under operating conditions. An example of the latter is a package recently designed by SPEC to contain a lubricating mechanism which was to be used briefly in the field, constantly being shifted from one geographical area to another.

In this case the package was designed as an integral part of the machinery and for easy access and closure. The necessity for paint under such conditions is obvious. Another method gaining more and more acceptance in the packaging field is the treatment of wood with water repellent preservatives. These are easily applied by dipping or spraying, they dry fast, form a good moisture barrier at board ends, and protect against rot, insects, and other adverse conditions.

One word of warning: Before applying any repellent or preservative all boards should be cut to shape and all holes and mechanical modifications of shape performed.

One of the major physical properties of wood in relation to its strength is the configuration of the grain. Generally grain is determined by the method of sawing. Slope of grain is critical under conditions of stress, woods having lowest stress when annular rings are parallel to the load, and greatest stress when perpendicular to load.

In the latter case a further undesirable factor is introduced since such boards are apt to twist with changes in moisture content. The advantages of plain sawed wood over quartered sawed is that it is generally cheaper, shrinks less latitudinally, has fewer shakes, and has less of a tendency to collapse when being dried.

Advantages of quartered sawed woods over plain sawed are: Moisture affects it less longitudinally, there is less tendency for it to split, and it has little tendency to cup or twist. One grain trait that is very annoying and dangerous is a spiral grain condition. It is sometimes impossible to recognize the condition by observation. Should such a condition be suspected it can be determined generally only by splitting a board of the suspected wood.

Plywood is most often used in wood packaging for moisture proof crates, for reusable boxes, where the ratio of structural strength to weight is an important factor, or in the construction of wood packages over a critical minimum size, as in the packaging of such large bulky objects as wind tunnels or other large pre-assembled fabrications.

Looking At Plywood

The physical advantages of plywood over other wood packaging materials are: Greater strength per unit of weight; less affected by moisture; improved resistance to checking and splitting; and features balanced strength properties on any plane. The arrangement of plies and the considerations of plywood design and fabrication have no concern for the packager since grading and terminology of plywood are far more accurate and standardized than for other wood forms.

When used to describe plywood, "grade" means the quality of the outside plies or veneers whereas the term "type" indicates the moisture resistance of the joints. Grades range from A to D. In grading terminology a letter is used to describe the veneer quality on either side. For example Grade A-D plywood has Grade A veneer on one face and Grade D on the reverse face.

A special quality of interest to the wood packager is the fact that it can be nailed closer to the edge than other forms of lumber since the latter

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have a tendency to split at the edges where plywood does not. This splitting resistance is also important from the standpoint that impact loads or concentrated loads can be better sustained.

The disadvantages of plywood lie in the fact that its properties of bending tension or compression are not as great as solid wood with equal dimensions since inner cores are laid at 90° in the direction of stress or perpendicular to the grain. Various types and classes of plywood include:

Types And Classes

Type I Plywood — weatherproof
Class I — untreated
Class II — surface treated

Weatherproof plywood may be used in boxes intended for service under extreme conditions of prolonged exposure to wetness or long periods of alternate wet and dry conditions. (See NN.P-515)

Type II Plywood — special moisture-resistant
Class I — untreated
Class II — surface treated

Special moisture-resistant plywood may be used in boxes where a considerable resistance to moisture is needed. (See NN.P-515)

Type III Plywood — weather-resistant
Class I — untreated
Class II — surface treated

Weather-resistant plywood may be used in boxes where a reasonable degree of moisture resistance is desired but where extreme conditions and outside storage are not expected. (See NN.P-515)

Type IV Plywood — non-moisture resistant
Class I — untreated

Non-moisture resistant plywood cannot be expected to withstand exposure to rain or other wet or very moist conditions. It is suitable, however, for use in boxes intended for the ordinary, commercial transportation of goods. (See NN.P-515)

At this point we might again mention the increasing use of laminated structural members by wood packaging engineers in recent years. These woods are finding increasing use in applications where the packaging of heavy, awkward or off-balanced machinery presents a problem. The use of this material in smaller packages generally is confined to applications where the use of materials with high strength and low weight are more important factors than cost.

An example is in the fabrication of reusable crates or boxes or where the configuration of the item to be packed presents a problem. In many such cases the use of conventional wood packaging materials would create excessive cube and voiding. The use of laminated members of straight, curved, or cantilever design find enthusiastic acceptance by engineers.

Much of the preceding discussion has a direct bearing on the use of fasteners other than nails. These include machine, carriage, and step bolts, and lag screws. Plain washers should be used under the head of machine bolts. Bolts used with the head under the skid should be carriage or step bolts, or a machine bolt with washers and head countersunk. Washers should be used under the nut at all times. (See MIL-C-6057A (ASG)

A plain washer should be used under the head of each lag screw. All non-demountable crates should be assembled with nails and metal straps. If so desired, for easy removal and to prevent damage of the contents, the sides, ends, and top of a nondemountable crate may be assembled by nailing and strapping and this unit fastened to the base by lag screws. (See MIL-C-6057A (ASG)

All demountable crates should be assembled with lag screws and bolts. As an alternative, the top, side, and end panels for demountable crates may be nailed to each other and the unit fastened to the skids and headers by means of lag screws and bolts. (See MIL-C-6057A (ASG)

It is good commercial practice and required military practice to drill holes the exact diameter of the bolt. The fit should be such that the bolts cannot be inserted in the holes unless they are lightly tapped. It follows that excessive moisture content has a considerable bearing on this fit.

Details Of Loads

Naturally, the first consideration of any wood package is the material to be packaged and its composition. The three types of loads specified in Standard Military Specifications and by the National Wood Box Association are convenient guides in the design of wood packages. An excellent discussion of these was given by Lt. Col. John K. Mount, USAF, at the Packaging and Materials Handling Short Course conducted by SIPMHE in cooperation with the University of Illinois in 1952.

"A Type 1, Easy Load: — Type 1, easy loads include (a) articles of moderate density packed in an inside container which completely fills the outside container and through the medium of inner containers supports all faces of the outer container, (b) articles of sufficient strength to withstand the forces encountered in transportation and handling, and of such shape as to fully contact and substantially support all faces of the shipping container.

"For this type of load the outer container merely serves to consolidate the contents and protect their surfaces from abrasion. Examples: Solid material (one piece); boxed articles, paper, or textile, chest or kit of tools, wooden cabinet, boxed sturdy instruments.

"A Type 2, Average Load — Type 2, average loads consist of items which are moderately dense and require a reasonable amount of protection. Such items may either be packed directly into the outer container or in intermediate packages which aid in supporting the faces of the outer container. The items or packages must provide a moderate amount of support for all faces of the shipping container to be classified as a Type 2 load. Example: Items in metal cans, bottles individually cushioned, hardware and other articles in cartons.

"A Type 3, Difficult Load — Type 3, difficult loads consist of items which are highly concentrated, or require a high degree of protection. Items in this category furnish no support to the faces of the shipping con-

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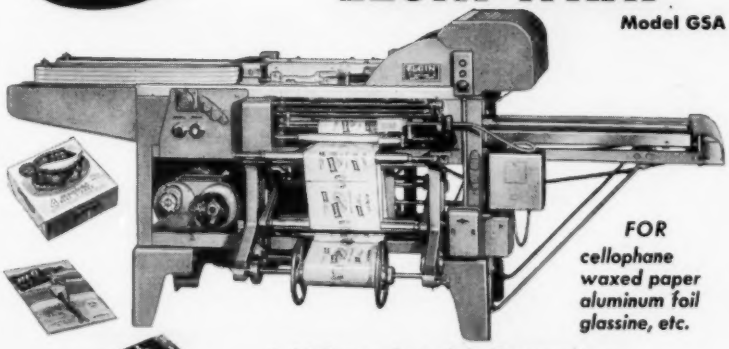

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tainer, rather in many instances tend to apply concentrated forces to the container's surfaces. Examples: Dense articles such as rivets, bolts and nuts which are free to shift or flow. Delicate instruments, machined parts and assemblies which do not completely fill the shipping box."

Col. Mount also adds a Type 4 load which includes those loads of a highly concentrated nature which exert extreme forces on any of the six faces of the container, contents which do not fill the container and permit extreme movements therein, and contents of a dangerous or hazardous nature. He cites examples of these as being metal bars, sheets, balls and chain; large gears, crank shafts, axles, large tools; or acids, poisons, or explosives, subject to ICC regulations.

Although the preceding discussion may sound overly complicated, each of the factors outlined, nevertheless, must be considered in the light of today's packaging trends which more and more are calling for a compromise between minimum cube, lightweight, strength, and cost. Never before has an analysis of wood properties been so critical.

It has been proven time and again by packaging engineers who recognize this that such correct attention to all factors of wood package design has reduced package weight per unit of strength by as much as 50%, and cost by as much as 20%. They have found particularly that when large numbers of wood packages with their loads are to be shipped by air the savings effected have been well worth the added engineering time and inspection supervision during fabrication.

About boxes and crates:

As suggested by Mrs. Salembier, readers will find two articles of help: "Technique of nailing a wood box" and "Technique of nailing a wood crate," both by L. O. Anderson, engineer, Forest Products Laboratory, U. S. Department of Agriculture, Madison, Wisconsin. These articles appeared in our June and November 1957 issues respectively. A third article by Mr. Anderson, "Nails and their characteristics in boxes and crates," will appear in a forthcoming issue.

Tracing the cause of corrugated box damage led the engineers of Stanley Home Products, Inc., to try first a corrugated pad to distribute the load within each box and second, a pair of rollers at the bottom lifting lever on the case sealer. Effectiveness of these rollers permits doing away with the corrugated insert and provides the trouble-free movement of cases through the sealer.

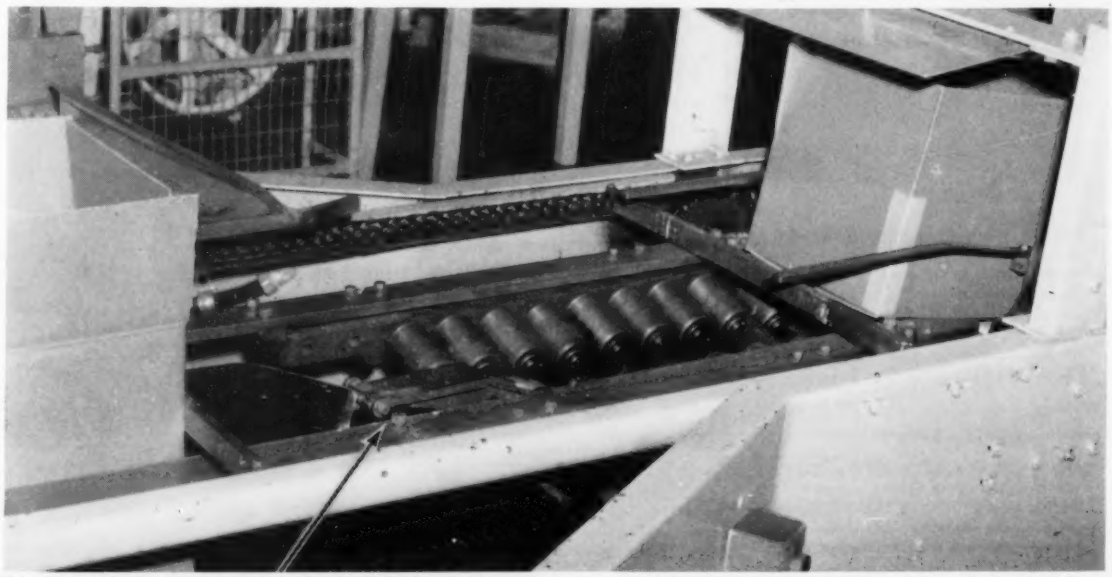
How tiny rollers prevent corrugated box damage, avoid use of extra pads in boxes

Long narrow corrugated shipping containers, packed with a single layer of cans in a 8 x 3 pattern at Stanley Home Products, Easthampton, Massachusetts, Inc., frequently gave trouble when passing through an automatic top-and-bottom case sealer. Rear-end bottom flaps of such cases often were torn off. Diagnosis of the cause of the trouble was easy; the weight of the heavy cans of product was causing the end flaps to bulge downward when the side flaps were being opened by the machine just prior to sliding on top of the package plate. The front flap gave no trouble whatever, but the bottom flap was frequently caught by the sharp end of the package plate and torn before the machine could be stopped.

The first effort to solve the problem was to insert a corrugated pad filling the entire bottom of the case before packing the cans into it. The pad would distribute the load and avoid the slight downward projection of the bottom end flaps. But the added cost of the pads alone was $3,500 a year. Hence a better method was sought — and eventually found.

A pair of tiny rollers was mounted near the tip of the bottom lifting lever on the case sealer. This lever has the function of momentarily holding up the end flaps and contents during the short intervals between the point where the side flaps no longer carried the load and the point where the flaps and contents are riding on the top of the package plate. Although there is very little space between these two points it was large enough to allow the rear flap to be pressed down far enough to catch the package plate, and tear.

By adding the two small rollers, shown in the illustration, the rear-end bottom flap is now carried high enough so that it is never caught by the plate. The diameter of the rollers is sufficient to give a slightly higher lift than the normal lift supplied by the original lever. Thus the need for the bottom corrugated pad has been eliminated and the resultant saving approximates $3,500 a year.



This pair of small rollers mounted on the tip of the bottom lifting lever serves to eliminate all tearing of the rear end flaps of corrugated boxes going through this top and bottom case sealer. These rollers make possible carrying the rear end bottom flap high enough so that it is never caught by the package plate — the V-shaped plate just to the left of the small rollers. Roller diameter is sufficient to give a slightly higher lift than that normally supplied by the lever.

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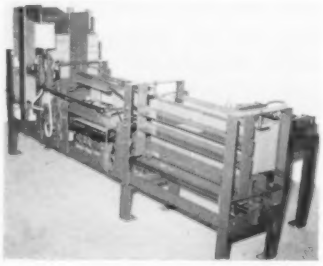
Case Opener and Former

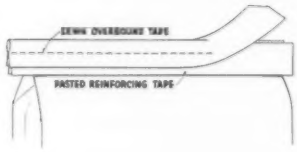
Schroeder Machines Corp. announces the development of the Formnumatic, an automatic case opening and forming machine. The Formnumatic selects a flat case from the magazine, advances the case, applies glue, opens and forms, folds in the bottom flaps, and seals it. The machine is pneumatically driven. The Formnumatic



can be custom built to meet individual requirements. The gluing mechanism may be omitted if the machine is used merely as a case opener and former. The Formnumatic delivers an opened, bottom sealed case in approximately nine feet of machine length. Circle No. 1.

Reinforced Bag Closures

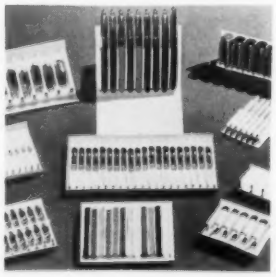
Union Bag-Camp Paper Corp. has developed the Sew-Strong closure for open-mouth multiwall bags. This improvement consists of reinforcing tapes which are fastened to both ends of the bag at the sewing line. The tapes serve to strengthen the bag ends, where most bag breakage occurs, Union Bag says. The Sew-Strong closure is said to make possible a reduction of at least ten per cent in the basis weight of the bag, resulting in lower bag cost. Any sewing head



with a bound-over tape attachment can be used to apply the Sew-Strong closure, Union Bag says. Circle No. 2.

Protective Packaging

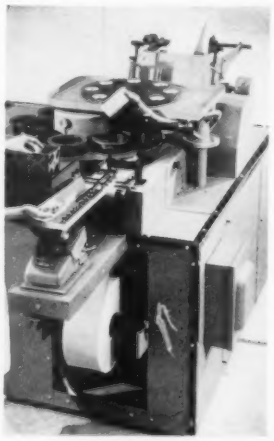
American Rondo Corp. announces the availability of a fluted corrugation which holds and protects inserted objects during handling, shipping, and storing. The main feature of this protective packaging is a spring-clip action of the partitions, which hold inserted objects in a cushion of air.



The trays are delivered cut to a predetermined number of partitions as specified. These new Rondo packs can be used to protect delicate, cylindrical products with diameters ranging from 8 to 26 mm. The packs are also designed to hold rectangular and odd-shaped items. Circle No. 3.

Small Parts Packaging

Product Packaging Engineering has introduced the Pax-Mor machine. This machine automatically prints, seals, cuts off, and counts packages up to 8″ x 8″ in a continuous flow. Speeds up to 6,000 bags/hr. may be reached, according to Product Packaging. The Pax-Mor can accommodate almost all types of coated or laminated heat-sealable packaging materials, producing bags that are non-wrinkle, waterproof, and moisture and water vapor proof, if required.



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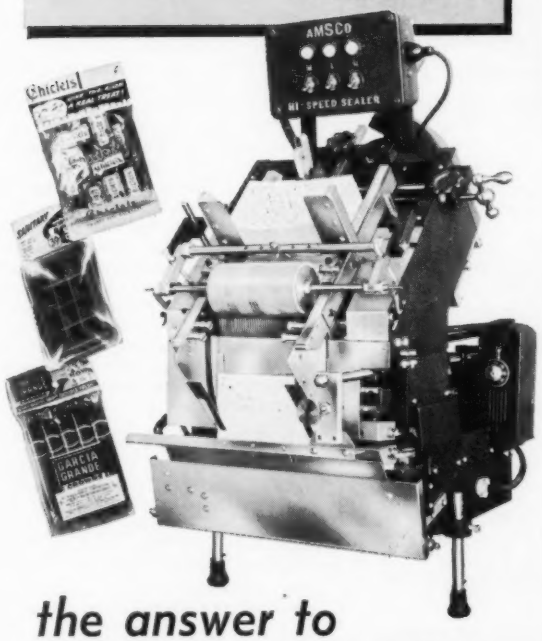

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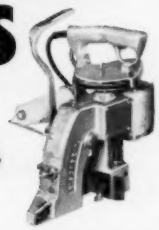

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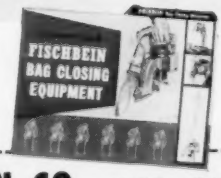

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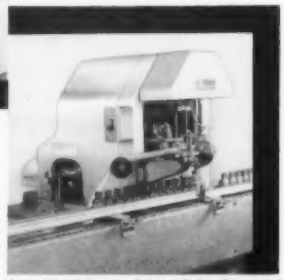

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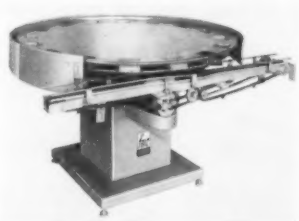
Multiwall Bags

Owens-Illinois announces a new type of multiwall paper bag which features a pasted valve reducing insert. This insert permits standardization of pallet patterns regardless of the density of the packaged product, Owens-Illinois says. Though it is of standard length and width, the capacity of the bag is varied to suit the properties of whatever is put in it because of the valve reducing insert. Customers may specify any size valve reducing insert needed to fit packing machinery filling spouts. The bag is three-ply, using two 40 basis weight sheets and one 50 basis weight sheet of natural kraft paper. Circle No. 5.

High Speed Carton Filler

Food Machinery and Chemical Corp.'s Canning Machinery Division, together with the Marathon Corp., has designed a machine for filling frozen food cartons at speeds up to 240 cans/min. (retail size) and 110 cans/min. (institutional size). Known as the FMC No. 16-S Carton Filler, or No. 8-S for institutional packs, the machine employs a straight-line feed that curves slightly at the filling station to permit adequate time for the premeasured product to enter the carton. Among the features of this machine is a "no carton-no fill" device



on the filler's pocket. A wide range of carton sizes can be accommodated and interchangeable filling tops (16 pocket or 8 pocket) make it possible to convert the basic machine for retail or institutional size cartons. Circle No. 6.

Metalized Heat-Sealable Film

Minnesota Mining and Mfg. Co. announces a new heat sealable polyester film that looks like aluminum foil but can be flexed almost indefinitely without affecting film properties. This metalized version, known as No. 20A2C, of the Scotchpak brand film is designed specifically for packaging

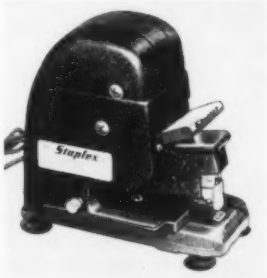
applications where both low water vapor and gas permeability are important. The two-mil caliper film has a water vapor permeability of .02 g./100 sq. in./24 hrs. Air permeability is .2 c.c./100 sq. in./24 hrs. The metalized film is said to retain its properties within a temperature range of from —70° F. to 230°F. Circle No. 7.

Can Linings

Allied Chemical & Dye Corp., Barrett Division, has developed a new phenolic resin known as Resin #3725. This resin, designed for use in can linings and bottle cap liners, is said to resist acids effectively. Resin #3725 is a 100% phenolic, non-heat-reactive oil-soluble resin. It has displayed excellent resistance to acid and alkali and is characterized by its flexibility and durability, Allied Chemical says. Resin #3725 is useful in the canning of such food products as meat, fish, and vegetables, and in the canning of cosmetics, cleaners, dentifrices, medicines, detergents, and paints. Circle No. 8.

Electric Stapler

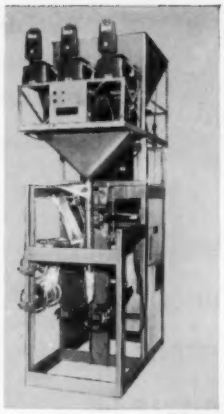
Staplex Co. has a new electric stapler, Model SE-77, known as the Golden Touch stapler. This unit drives a



staple at a touch on its staple bar. Called a mass market stapler, this unit is said to be one of the lowest priced put on the market by Staplex. The SE-77 weighs about 7 lbs., is easily portable, and plugs into any A.C. outlet. Circle No. 9.

Strapping Tape

Nashua Corp. has developed Itstix Strapping Tape, a water moistenable kraft tape. The strength of this tape is derived principally from a "shoulder to shoulder" construction, with a layer of continuous rayon fibers linealiy aligned and imbedded in a strong and resilient material. Two sheets of kraft, one flat and one crepe, make up the outer piles of the tape. The flat kraft is gummed with animal glue. The tape is said to have a high tensile and tear strength, super shock resistance, quick adhesion to many surfaces, and flexibility. Circle No. 10.



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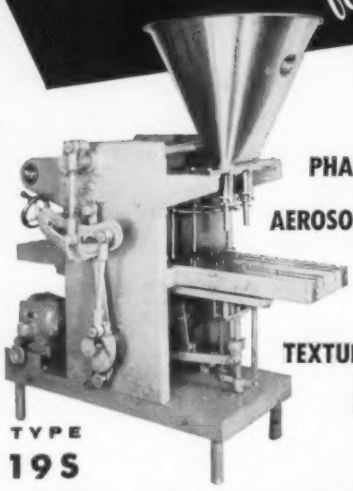

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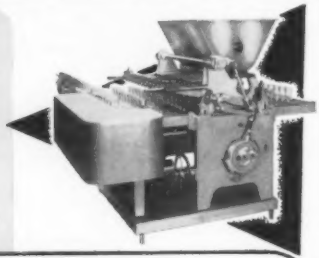

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To make sure your containers are free from foreign matter when filled, use the GEYER ROLL-OVER CLEANER. It removes glass pieces, dust and dirt from containers by inverting them 180 degrees and cleaning by air blast. This roll-over method is safety insurance for any packer because it assures positive cleaning. Speeds are from 40 to 200 containers per minute.

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Pro's and con's of constant and intermittent motions in automatic packaging machines

(Continued from Page 35)

due to the fact that the working operations take place over a distance as the package travels, while a stationary package requires only slightly more than its own length for each station. The tendency to become elongated may be compensated for by building vertically as well as horizontally, which is done in several types of carton forming machines.

Influences On Packages

After a constant motion machine has control of a package, it only exerts enough force on the package to overcome the frictional resistance between the package and the machine. This force is always applied in the same direction (discounting centrifugal forces which occur in going around curves). It is necessary to stop or at least slow down the packages entering the machine so that they can be timed to properly enter the flight system. This operation can be very troublesome, particularly where the product in the package can flow or become disarranged due to such deceleration.

The intermittent machine must accelerate the package from rest to a peak speed, and then decelerate it to rest again each cycle. If the machine is operating at a reasonably high speed, and/or if the package has appreciable mass, inertia will cause the package to push on the leading flight during deceleration. Products which flow or become displaced by such a reversal of forces might be difficult to handle. The necessity of providing a leading flight to slow down and control the carton during deceleration adds a complication to the machine. This is particularly significant if the machine is built to accommodate a variety of sizes, in which case the leading flight would either have to be replaced or mounted on a separate chain so that it could be adjusted.

Maintenance

If an intermittent machine is run at high speeds, it will tend to wear out and break more parts than a corresponding constant motion machine running at the same output. It must be remembered that an intermittent machine is generally intended to run at a slower speed. Within the intended speed range, its service should be good, and repair and maintenance nominal.

Philosophy Of Design

A designer will study the requirements for a machine carefully and one of his first decisions will be whether to make the package motion constant or intermittent. He will try to do it with constant motion if he can, and will resort to intermittent mechanism only if he has to. Requirements for packaging operations are so diverse that intermittent mechanisms will continue to hold a large place in the field.

Industry literature available free

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Packaging Course

American Management Association offers literature on its Packaging Division Program for February 1958 through June 1958. The Packaging Division of AMA conducts a series of packaging clinics and workshop seminars designed to increase the scope of packaging knowledge and understanding among management people. Among the topics to be discussed in the current series are package planning, packaging research, writing packaging specifications, flexible packaging materials and equipment, and packaging committees. Circle No. **101.**

Rotary Piston Filler

The Pfaudler Co. offers Bulletin 959, providing specifications for a 21-station rotary piston filler. Illustrations of mechanical drawings are employed to describe this unit. This machine packages viscous or semi-solid products at speeds up to 500 cans/min. Its accuracy is rated at + or — 1/10 fl. oz. This machine features a high-speed "no container-no fill" mechanism and a simplified change-over for different can sizes. Circle No. **102.**

Rust Preventive Papers

The Marvellum Co. has issued a bulletin which lists the characteristics and applications for Marvellum VPI packaging materials. These are special packaging papers coated with a chemical that slowly produces vapors which prevent rusting of ferrous metals. The materials are manufactured to meet MIL-P-3420, Type I. The brochure includes a listing of 23 different grades of this material and describes the construction of each grade. Circle No. **103.**

Vacuum Packaging Machine

Royal Packaging Equipment, Inc., explains the advantages of the Royal-Vac machine in an illustrated information sheet. This unit can be used in food packaging where vacuum packaging is necessary to prevent color loss and spoilage of pre-cooked frozen foods. This unit produces pouch packages ranging in size up to 11½" x 22". Speeds of 15 pkgs./min. on 1-lb packs are obtained. Circle No. **104.**

Counting and Imprinting Machine

Pitney-Bowes, Inc., offers two pieces of literature describing the Tickometer, a counting and imprinting machine for automatically counting, dating, coding, and imprinting labels, tags, cartons, etc., at speeds from 500 to 1,000 pieces/min. A ten-page brochure, "Your Employees' Time Is Too Valuable to Waste," gives specifications and operating features of this machine. A separate bulletin of twelve case studies of savings attributed to the use of this unit is also included. Circle No. **105.**

Padded Shipping Bags

Jiffy Manufacturing Co. offers a group of 13 performance report sheets describing how its padded shipping bags are used in a wide variety of packaging operations. These padded bags will protect products against abrasion, fire, water, and shock. Circle No. **106.**

Creped Greaseproof Wrapping

Ludlow Papers, Inc., manufactures a new grade of polyethylene-coated creped wrapping paper which is described in a current information sheet. Called Poly Induwrap, it is a Grade A paper qualified under Mil-B-121A for wrapping slushed metal parts. The polyethylene coating retains its properties in high and low temperatures, and the sheet is secondary creped for easier packaging and for tight, conforming wrapping of irregular shapes. Circle No. **107.**

Polyethylene Blends

Semet-Solvay Petrochemical Div. of Allied Chemical & Dye Corp. offers Bulletin P/S 234. This bulletin lists the advantages of A-C polyethylene, an inert, low molecular weight polymer, which can readily be blended with waxes, polymers, and resins in hot-melt or water emulsifiable grades. When added to wax coating it improves gloss, reduces scuffing, and imparts a high blocking point, Semet-Solvay says. A check-list of product applications is included. Circle No. **108.**

Polyethylene Bag Sealing

Carbert Mfg. Co. offers an illustrated data sheet giving specifications for the Model 1010 polyethylene bag sealing machine. This unit provides automatic high-speed sealing, producing a filled, snug contour package with a hairline seal. Bags handled range from 4" x 4" to 12" x 12". Circle No. **109.**

Hopper Feed Conveyor

Frazier & Son has an illustrated data sheet that describes the Whiz-Lifter Feed Conveyor. This machine elevates dry products from a bin reservoir at floor level by means of conveyor buckets to a point above the hopper of a filling machine. The buckets of this unit are available in either stainless steel or high impact styrene. The styrene buckets are non-corrosive, non-magnetic, and non-toxic. Where downtime for cleaning must be cut to a minimum, an additional set of styrene conveyor buckets can be obtained at a nominal cost. Circle No. **110.**

Polyethylene Film

Spencer Chemical Co. has published a comparative film property data sheet. It compares its "Poly-Eth Hi-D" 2504 with conventional density polyethylene in respect to such characteristics as melt index, tensile strength, elongation, tear strength, etc., and refers to the ASTM test methods used. Circle No. **111.**

Automatic Scale

Lynch Corp. has published a bulletin describing its Wey-Mor automatic scales. Handling such products as hardware, potato chips, chemicals, cookies, etc., this unit operates in the ½ oz. to 5-lb. range, making as many as 55 weighings/min. The Wey-Mor features a double vibratory follow-through feeder and bulk and dribble feeder to insure even product flow into the weigh bucket. Circle No. **112.**

Waterproof Tapes

The Kendall Co., Polyken Sales Div., has an illustrated brochure, No. P5-5, which describes two different grades of waterproof, pressure sensitive tape. These are cloth-backed tapes which are coated with polyethylene. One grade meets government packaging specification JAN-P-127 Type I Grade A. The other grade provides low cost moistureproof packaging of spare parts items. Circle No. **113.**

Aerosol Packaging

Continental Can Co. offers a brochure entitled "Aerosols." It surveys the market and product field, outlines Continental's facilities and services, and provides a listing of contract fillers, valve manufacturers, and other aerosol industry suppliers. Circle No. **114.**

Polyester Film

E. I. DuPont de Nemours & Co., Inc., Film Dept., has brochure No. A-2456-a, which describes the advantages of "Mylar" packaging film. This twelve-page brochure includes a listing of the chief characteristics of this material and reviews with many illustrations the applications of this film in overwrapping.

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MATERIALS ELEVATING MACHINE — Assures speedy, automatic bulk product elevating into hopper of a weighing or filling machine without danger of spillage or breakage! Will handle drugs, hardware, pharmaceuticals, plastics, chemicals, etc., with trouble-free efficiency.

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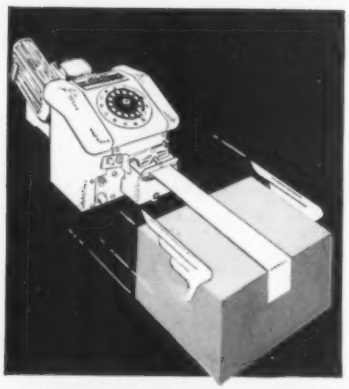
Circle No. 252 on Card



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T-28

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window boxing, in laminations, and in automatic bundling. Circle No. **115.**

Wrapping Machine

Rosenthal Mfg. Co. has a data sheet on its Wrap-O-Matic machine that feeds and cuts all kinds of wrapping paper, cellophane, single-faced corrugated, etc. It will feed and cut any of four predetermined sizes automatically. Sizes can be changed quickly. Circle No. **116.**

Vinyl Printing Inks

Claremont Pigment Dispersion Corp. offers Technical Bulletin 510 which describes its "VC" series of gravure inks for multicolor printing of vinyl. The bulletin extensively describes the performance of a number of inks in regard to lightfastness, soapfastness, abrasion resistance, bleeding, crocking, blocking, heat sealability, and mark off. Suggested uses for different inks are included. Circle No. **117.**

Rigid Plastic Boxes

Bradley Industries, affiliate of Bradley Associates, Inc., has a new catalog of rigid plastic boxes. The catalog describes completely hinged boxes, telescope and slide cover boxes, square and rectangular boxes, round boxes, vials, hinged compartment boxes, and miscellaneous boxes. Size specifications and prices are included. Circle No. **118.**

Cast Vinyl Film

Bakelite Co., Div. of Union Carbide Corp., has an 18-page brochure describing Krene cast vinyl film. The brochure reviews the chemical and physical properties of Krene, and lists the applications for twelve different grades of the film. Krene is heat-sealable and can take printing inks. Technical data on this film is included in the brochure. Circle No. **119.**

Limit Switch

Micro Switch, Div. of Minneapolis-Honeywell Regulator Co., offers Bulletin 20, which tells about the new Plug-in Limit, a precision limit switch which can be replaced quickly. A complete description of the switch, with drawings and photographs, is included, and all five actuator types are shown. The bulletin covers mounting information and prices. Circle No. **120.**

Strapping Tape

Johns-Manville, Dutch Brand Div., has a brochure giving details of its pressure sensitive strapping tape, No. 400. No. 400 tape has a vinyl backing and is reinforced with glass filaments. It meets U. S. government specification PPP-T-0097a Type II. This tape is useful in reinforcing, holding, bundling, palletizing, unitizing, and tear stripping. It has tensile strength of from 250 to 270 lbs/in. Circle No. **121.**

Fertilizer Bagger

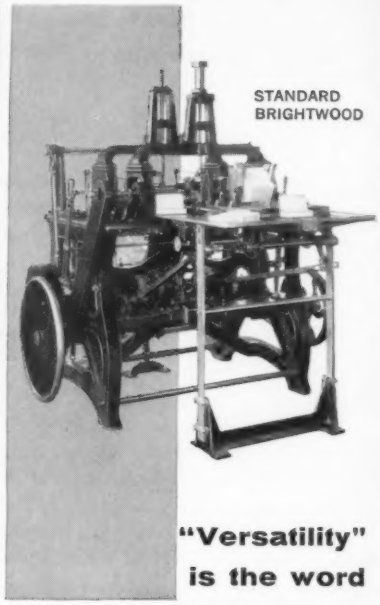
Bemis Bro. Bag Co. offers a four-page bulletin describing its Rapid-Weigh bagger for fertilizers. The bulletin contains performance and engineering data on this new machine which fills bags with pelleted, granular, and meal type fertilizers at speeds ranging from 24 to 100 lb. bags/min. Weight tolerances are said to average + or — 2 oz. Circle No. **122.**

Silicone Sponge Rubber

The Connecticut Hard Rubber Co. has a two-page data sheet listing the properties and applications for COHRlastic R-10470 silicone sponge rubber sheets. These sheets meet AMS 3195 and 3196 specifications. The data sheet lists such properties as tensile strength, elongation, tear, water absorption, density, compression deflection, etc. A sample of the silicone sponge rubber is available. Circle No. **123.**

Container Linings

Synthetasine Protective Coatings, Inc.,



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Any desired batch count from 1-10,000 may be selected on the top row of switches and, if desired, a warning solenoid, feed gate, or similar action can be activated by setting the lower row to your "warning count".

Visual totalizer registers batch counts . . . the counter, itself, resets to zero when preset number is reached. For all electronic counting, timing, or synchronizing problems, consult POST. Write for literature.

Decitron Electronics Products Division

POST

POST MACHINERY COMPANY

Beverly, Mass.

has a leaflet describing its Synthetasine 300 lining. This lining is said to offer excellent chemical resistance for hard-to-package products packaged in steel shipping containers. This new coating effectively resists such products as detergents, dilute mineral acids, chlorinated solvents, formaldehyde, fatty acids, emulsions, alcohols, oils, greases, and various foods. Synthetasine 300 contains more phenolic than epoxy resin. Circle No. **124.**

Metal Containers

Sherwin-Williams Co. has a new booklet which spells out in detail the specifications of the various metal containers available from that organization. Line drawings illustrate the containers, and photographs cover the Snap-On Clips, container accessories that eliminate the need for content-designating labels. Also included is a page devoted to a quick guide to container specifications — a list of reminders designed to expedite service and insure on-time delivery. Circle No. **125.**

Laminations

Lamart Corp. offers a brochure in which new developments such as triple lamination and aluminized butyrate thermoforming "sandwiches" with sealed-in color are featured. The folder describes a wide range of standard laminates, including the available properties and working characteristics of each. Also included is a comprehensive list of products and product components made from laminations. Circle No. **126.**

Packaging Cost Reduction

Hinde & Dauch has a revised edition of its popular booklet, "How To Ship More Economically in Corrugated Boxes." This 24-page publication includes pertinent advice on the designing, testing, and storing of product packages. It also offers information on the planning of the shipping department and on economy considerations in the packing, sealing, warehousing, and shipment of corrugated boxes. Circle No. **127.**

Missile Parts Packaging

Cotswold Fibres, Inc., is offering a copy of Packaging Specification MPD-538C for packaging guided missile parts. A reference outline of materials that meet this specification is also offered as a supplement to the specification itself. Circle No. **128.**

Aerosol Packaging News

Aerosol Techniques, Inc., has published a newsletter, "Pressure Gauge," which it is offering free to companies and individuals in the drug, cosmetic, pharmaceutical, chemical, food, housewares, and industrial fields. This newsletter includes news and comments on developments in the field of aerosol packaging and also contains a technical bulletin dealing with pressurized nitrogen aerosols. Circle No. **129.**

Nailing Clips

Tri-Wall Containers, Inc., offers a folder on its new nailing clips. These clips were specifically designed to secure nails and bolts to triple-wall corrugated board without shearing for heavy duty packaging. The folder illustrates many common examples of applications for these nailing clips. The clips may be used in conjunction with wood blocking, framing, and bracing. Circle No. **130.**

Elastomer-Phenolic Film Adhesives

Rubber & Asbestos Corp. has a ten-page report on its Plymaster V-2 and V-3. These products are elastomer-phenolic film adhesives for the flat surface bonding of metals and plastics. Data outlining the generic advantages of dry, solvent-free film adhesives, specific technical information applying to 4- and 11-mil films, and data on various reactivation methods which may be used to achieve bonds with tensile shear strengths in excess of 1,800 psi accompanied by high peel strength

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AUTOMATICALLY FEEDS COUNTS WRAPS SEALS CODES

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FOR AUTOMATED ASSEMBLY LINES THE SEMI-AUTOMATIC VIBRACOUNT

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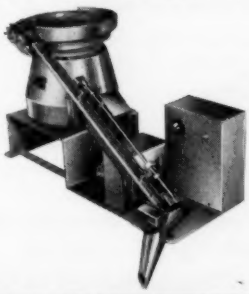

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Division of FRANKLIN RESEARCH CORPORATION

FITCHBURG, MASS.

values are included. Circle No. **131.**

Heat Sealing

U.S. Industrial Chemicals Co. has published a report entitled "Heat Seal Characteristics of Polyethylene Film." This report is illustrated with 40 graphs, and includes data on the prime conditions such as time, temperature, and time and temperature ranges within which satisfactory heat seals can be made. The effects of such resin characteristics as melt index, slip agents, and resin density are explained and illustrated. The series of graphs shows the heat seal characteristics for various resins in USI's Petrothene polyethylene resin series. Circle No. **132.**

Paraffined Carton Packaging

Paraffined Carton Research Council offers an illustrated poster containing 14 points of good handling of ice cream, butter, margarine, and lard cartons. Each of the 14 "do's and don'ts" is illustrated with cartoons demonstrating such points as where and how to store shipping cases, how to inspect incoming cases, the prebreaking of cartons, and how to align cartons properly on filling machines. The poster is designed for use on the walls of receiving rooms, warehouses, and in packaging departments. Circle No. **133.**

Cushioning Material

Vanant Co., Inc., has an illustrated brochure describing its Sus-Rap inner packaging material. Sus-Rap is used for cushioning such items as radios, electric motors, typewriters, foils, films, and paper stock, glass, porcelain enamelware, and delicate mechanisms, among other things. Circle No. **134.**

Filling Machines

Hope Machine Co. has issued an operating manual for its two-line filling machine Type 19S. The manual is available to both users and non-users of the machine. The booklet contains 16 exploded view drawings, detailed operating instructions, and points on maintenance, plus a parts list. Possible sources of trouble are covered, with recommendations for handling such problems. The Type 19S filler is designed for filling containers with liquid or viscous products. Circle No. **135.**

Bag Closer

Dave Fischbein Co. has a four-page bulletin giving details on its portable bag closer. The total weight of this machine is 10½ lbs. It requires no installation, but merely plugs into any electrical outlet. It handles textile and paper bags, closing an average 100 lb. bag in less than 6 seconds, according to its manufacturer. The stitch range is from 4 to 5½ stitches/in. Circle No. **136.**

Imprinting Machine

Adoph Gottscho Inc. has a bulletin describing its Markocoder, a portable imprinting machine. The Markocoder may be wheeled up and adapted to any line, and occupies an aisle space 24" x 30". This automatic machine needs no operator, can be shifted from one line to another, and can handle, with the use of change parts, a variety of container sizes. It imprints up to 600 units/min. The Markocoder is especially adapted for the imprinting of drug, cosmetic, dairy, beer, and paint containers, as well as for products requiring a bottom code, price mark, or other changeable legends. Circle No. **137.**

Foil Crimping Machine

Kaiser Aluminum and Chemical Sales Corp's Foil Kraft Division offers a brochure on its Foilcrimp machine. Roll-fed cover stock is applied automatically to each tray and is then combed down snugly to adjust to variations in product height. Nylon rollers neatly crimp each covered tray as it emerges from the machine, forming a tight-fitting closure. Circle No. **138.**

Film Tube Packager

Mercury Heat Sealing Equipment Co. explains the operation of the "Verti-Pak" machine in a bulletin. It automatically forms a bag from heat-sealable roll stock, fills, and seals it. This unit handles hardware, toys, textiles, candy, drugs, produce, etc., at speeds of 30 to 50 pkgs./min. Circle No. **139.**

Polyurethane Foam

Durable Rubber Products Co. has a four-page folder which gives the general specications for polyurethane foam. This material has a high tensile strength, is tear resistant and heat resistant. Polyurethane foam is available in a wide range of colors, thicknesses, and densities. Polyurethane parts can be supplied to fit individual specifications. The material is currently being used as carpet underlay, upholstery and automotive cushioning, and insulation. Circle No. **140.**

Stencil Inks

Reynolds Inks, Inc., has a revised combination folder and color card describing its line of stencil inks that spray on from an aerosol container. The folder has illustrations of typical applications such as the stenciling of cartons, fabricated metal parts, steel drums, and the color coding of steel. Circle No. **141.**

Polyethylene Tubing

Andmar Plastic Co., Inc., offers its "Converters Polyethylene Tubing Guide," which contains a number of interesting and helpful facts about polyethylene film tubing. The guide includes two tables which show the micrometer readings for films of various gauges and show the amount in yards in each pound of polyethylene tubing. Circle No. **142.**

Protective Closures

Shurclose Seal Co. has issued a four-page catalog on its caps and plugs. Complete

a uto covers TO Z ither bags

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Circle No. 258 on Card

specifications are given for both rubber and plastic closures for the protection, sealing, or masking of threaded parts, pipe ends, or tubing. Seven styles of stock sizes are covered by the specifications. Circle No. **143.**

Roll Feeds

Ferguson Machine Corp. offers Bulletin No. 600 in which various types of its roll feeds are described. These feeds are designed for medium and long production runs at speeds up to 1,000 strokes a minute. The high-speed roll feeds employ Ferguson drives which maintain repetitive accuracy without adjustments. The bulletin contains information on the operation and capacities of various roll feeds. Circle No. **144.**

Marking Machines

Industrial Marking Equipment Co., Inc., has published a catalog covering its entire line of marking, dating, and coding machines. Profusely illustrated, this catalog gives detailed technical data on the Whippet Marker, #7 Autoprinter, Rainbow Coder, and other standard units. It outlines base lock types and logos, as well as showing many of the custom-designed marking machines for special application throughout industry. Circle No. **145.**

CLASSIFIED ADVERTISING

Our classified advertising section is intended for use by those wishing to buy or sell used packaging equipment, to employ packaging personnel, seek such employment, offer or seek business opportunities. It is not available for general advertising. Terms: Cash with order. Rates: Up to 60 words, $10.00. If boxed, $20.00. Up to 120 words, $20.00. If boxed, $40.00. Up to 180 words, $30.00. If boxed, $60.00.

Circulation this issue in excess of 35,000

SITUATION WANTED

Packaging Director and Designer. Emphasis on design and packaging as a tool for merchandising. Seeking responsibility for complete packaging program, coordinating packaging with sales, advertising, production, purchasing. Please reply to Box 201 PACKAGE ENGINEERING, 185 N. Wabash Ave., Chicago 1, Illinois.

FOR SALE

For Sale — Packaging machine, Battle Creek Model BT30 and Bond M L Dual Filler. Fills, seals folding boxes, both bottom and top. Continuous flow principle. Quickly convertible. Wide range of boxes up to 10 inches in height, 30-40 per minute. Price new machine $15,120.00; this used one $5000.00. Reply to W. J. Wittekind Company, 1041 Richmond Street, Cincinnati 3, Ohio.

For Sale — Used Niagara packaging machine Model 200, Serial 179, 115 v. – 60 c. – 2000 w. For cello bag packaging of dry materials. Volumetric control. Capacity 440 packages per hour using 2 girls to operate. Please reply to Pophitt Cereals, Inc., 740 Washington Avenue North, Minneapolis 1, Minnesota.

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What we think

The making of a production line expert

As the experts roam all over the graphs in plotting the state of our 1958 economy, the implications for those running our packaging lines are clear. Whether business activity is at a high, low, or "anything in between" level, we can expect increased pressure to get more production at less cost.

Why do some plants do better than others?

Lest our urging of packaging line efficiency seems too obvious for comment, the fact is that many plants are not getting the most from their packaging operations. To verify this, one need merely visit a plant whose packaging costs are below that of its industry to see what keeps these costs down. But there is no magic key or a secret formula leading to packaging economy.

In a nutshell, we usually start with a product ready for packaging. We end with a packaged product destined for its channels of distribution. At the risk of oversimplication, we suggest that between the unpackaged and packaged product are four main elements.

These are men, materials, machinery, and methods. The differences between an efficient packaging operation and a mediocre one are careful attention to detail and the skillful coordination and combination of these four elements.

Our most distinguished production line experts are past masters at this. They develop a knack for inspiring their machine operators, packaging line mechanics, and plant engineering people to make machines run at decent speeds with less than optimum materials. Others have a gift for translating package quality control and net weight control into simple terms that line personnel readily understand. Still others have a rare talent for machine adjustment and modification.

Shift the blame or plug up the leaks?

Today's era of specialization often insulates individuals and groups performing specialized jobs in a given plant. Intensified development of new products and new combinations of packaging materials takes many people through uncharted waters. So it is easy for, say, a production man to shift the blame for packaging deficiencies to someone else.

"Our research and development people did not make adequate product-package compatibility studies . . . The folks in purchasing were not too careful in container specifications . . . The quality control boys let their control limits get out of hand . . . That personnel manager sent us people with no aptitude for packaging line work . . ."

Obviously, these things frequently do explain packaging line shortcomings. Their occurrence is common knowledge. But what makes a really able production line head stand out from the crowd is this: He makes the most of what he has without making excuses for what he doesn't have.

The time is here to plug up the leaks on our packaging lines. Getting more production, less machine downtime, less package waste, less product loss, and a higher quality of finished goods is largely a process of accumulation: Avoiding the accumulation of little things that slow down or break down the packaging operation, and concentrating on the accumulation of subtleties of technique that result in a truly efficient operation.

Resourcefulness – the mark of the expert

Perhaps the real hero of the packaging line is the one who can first spot these small points and do something about them. Two characteristics set him apart from his contemporaries: (1) He quickly visualizes operations and sequences in terms of workable, logical small units or stages (thus isolating troublesome spots for prompt, curative action), and (2) he worries less about the deficiencies of somebody or something outside his zone of responsibility than he does in capitalizing on his *own* immediate resources.

Maybe there is a third characteristic: The ability to have a sense of the urgency of maintaining day-to-day production without getting rattled by small problems that seem large only because an entire line is down until they are solved.

We need more of these individuals who make the most of their men, materials, machinery, and methods. Managers who have such people should encourage them to grow in their jobs. Those who think they don't have any should look again at the people who make the lines run. It may take but a little encouragement and only the slightest bending of a plant organization chart to provide a proper climate for the flowering of a production line wizard.

Bruce Holmgren

Editor

Double-compression method of packaging hops for shipment to brewers drastically cuts shipping and storage costs. Original bale (center) is compressed to half its size and heat sealed in VISQUEEN polyethylene film.

Money-saving, space-saving pack for hops uses VISQUEEN film

Trade Mark

Storage space requirements are cut in half and shipping costs reduced a dollar or more per hundred pounds by a new method of packaging. Developed by the Tri-State Processing Company, Yakima, Washington, the new technique consists of compressing an ordinary bale of brewers' hops to half its size, sealing it in an air-tight barrier of VISQUEEN film and putting it into a shipping carton.

J. O. Hughes, president of Tri-State, reports in addition to money savings, oxidation is reduced and no aroma permitted to escape.

This is another example of packaging economies made possible by VISQUEEN film.

If you have a packaging problem, perhaps our engineers can help you. Just clip the information request tag.

information request tag

VisQueen Trademark

clip this tag— #PE-2

attach to letterhead, mail.

VISQUEEN *film is all polyethylene, but not all polyethylene film is VISQUEEN. Only VISQUEEN film has the benefit of research and resources of VISKING COMPANY.*

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   When a Crossett customer is in trouble with any job, more often than not a skilled technician in packaging is on his way to help within hours of a distress call.

2. Production Versatility:
   Crossett cylinder machine equipment permits true custom production of a nearly endless variety of furnish, caliper and bleach. Control over the exact place in a sheet where hard wood pulp will help printability—where soft wood pulp will provide strength. We don't just make board—we build it—layer by layer to your specification.

3. Dependability of Delivery:
   Crossett is an independent mill producing bleached board. We have no financial tie with any type of converting operation. Each customer gets twice monthly delivery of his regular order produced from machine time belonging to him. In all markets the production time is yours—your supply is sure.

May we tell you the full story and show you samples?

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